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IS YOUR ENGINE A TICKING TIME BOMB?



Few people would argue the benefits of a modern diesel engine. They're powerful, torquey, eco-friendly and fuel efficient largely thanks to the combination of electronically controlled common-rail fuel injection systems as well as turbochargers and intercoolers. So it's pretty much a given that common-rail diesel engines are here to stay.

One question though: are they reliable?

That's the single aspect of common-rail diesel engines that has been debated since they first hit the Aussie shores at the turn of the century, and really it's something that we're yet to get a solid answer on. You hear all kinds of horror stories about CRD engines – about how people have spent thousands on replacing the injectors (and in some cases the entire engine!) of a near new 4WD. You hear the stories about a single batch of bad diesel destroying engines... about water ingress ruining the fuel-system... the list goes on.

A couple of years ago, I added a common-rail 4WD to my garage in the form of a 2006 HiLux. Now the HiLux is unarguably Australia's highest selling 4WD. In fact, it's fair to say there's many more HiLux's on our roads and tracks than any other 4WD, so everyone's experiences have varied. One owner will tell you that their HiLux is a beast with no problems, while another will tell you that they've had nothing but problems with theirs.

I'm not going to sugar-coat this – I definitely fall into the latter category. A couple of months after purchasing my HiLux (granted, second hand) I began having all sorts of problems with the

engine. I'd park it on a slight slope, and then when I'd go to start it, it'd blow plumes of smoke and sound like a drowning animal. Turns out, it's a pretty common-problem with a 1KD engine that has a few kay's on the clock. It essentially meant that the injectors needed replacing – no problems, off it went to a diesel expert and \$3,000 later, new injectors were installed and the issue was resolved.

Shortly after, I went on a big trip, and as I was driving a blacktop leg on the Hume Highway the engine light came on, and the vehicle dropped into limp mode. I pulled over, and turned the engine off. The light went away, and the vehicle went back into normal mode. This problem happened on-and-off for months before I cottoned on to what was causing it – the turbo was over-boosting, due to a blockage caused by carbon build-ups. Back to the diesel expert, and another hefty bill – problem resolved.

These days, the HiLux is running good – but only because I've spent the money on ensuring it's reliability. And to be honest, it was a pretty hefty amount in the long run.

Not everyone with a common-rail diesel 4WD will have had the same problems that I've had. In fact, it'd be fair to say that the majority of owners haven't experienced any issues, lucky them. That's the things about CRD engines – there's a lot of myths surrounding them. This issue of Overlander, we've got together five of Australia's top diesel experts in an effort to bust, and in some cases confirm these myths. Do you want to ensure that you don't experience the same problems with your 4WD that I have? Then make sure you read our major investigation. Fact: CRD reliability is achievable – and this month, we show you how to achieve it!

Cheers,

Travis Annabel
Editor

LETTERS

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OUTBACK TOURING 50 YEARS AGO

G'Day Overlander team,

As a reader of your magazine for many years and seeing all the modified 4WDs doing big trips, I thought you might be interested in my first trip in 1964.

Our grandfather decided to take myself and my cousin Ralph out to Birdsville, then down the Birdsville Track to Lake Eyre where the famous Donald Campbell was attempting to break the land speed record.

We left Emerald, Queensland in a standard EJ Holden station wagon, last of the grey motors, loaded to the hilt with swags, plenty of tinned food and water. Most of the food was lamb tongues, bully beef (I don't eat either anymore!) and fruit salad. We didn't have an esky for fresh food. There wasn't many caravan parks in these outback towns, so we just rolled out

our swags wherever it suited us, and bathe in cattle troughs.

When we reached Birdsville, we discovered that half of the (these days) iconic pub had been destroyed by fire, although it was still trading. After taking in the town, our next goal was to tackle the Birdsville Track. It had just received 2in of rain, making it very boggy in places. It took us two-and-a-half days after being bogged numerous times – even a hand winch would have been a big help! We arrived at the Army checkpoint on the edge of Lake Eyre, to discover they'd heard we were coming. They were planning to give us another half day before they'd come out to find us, as six months previous there had been a family of five that had perished on the track.

From there, we travelled through Oodnadatta onto Ayres Rock and the Olgas.

WINNER!

It was just a two-wheel track through the red sand and only a Rangers' hut at the rock, back then you could roll your swags out anywhere. There wasn't a chain hand rail back then, either!

We then went on to Alice Springs, which was still only a dirt track. From there it was onto Mt. Isa and back to Emerald, and apart from blowing a few tyres, the Holden didn't miss a beat.

I returned to Birdsville in a Toyota LandCruiser in 1988 with my now wife, where we were lucky enough to see them install a phone booth and connect the first ever telephone line to Birdsville.

Douglas Goldsworthy
Highfields, QLD



The Birdsville Pub, half destroyed by fire but still open!



Getting ready for the big trip in Emerald

**THIS LETTER
WAS SO GOOD,
WE DEDICATED
BOTH PAGES
TO IT!**



Me standing alongside the "Bluebird" on Lake Eyre – imagining what the security would be like these days!



Ayres Rock in 1964

The sandy Birdsville Track



G'day Douglas,

All I can really say is "wow". Your story and photos really show how much Aussie touring has changed over the last 50 years – it really was a completely different ballgame back then!

And what an adventure you had! The photos you sent in have been studied by everyone in the office, and those of us who have been to Birdsville found the photos of the half-destroyed Birdsville Pub to be absolutely fascinating. It's a testament to the toughness of outback folk that the pub is still standing and going strong to this day.

Thank you very much for sharing your outback adventure with us... it's sobering to think of how much things have changed, and how much easier it is these days to experience these iconic locations.

Cheers,
Trav

Bogged on the Birdsville Track – there wasn't many sticks or rocks to help get us out





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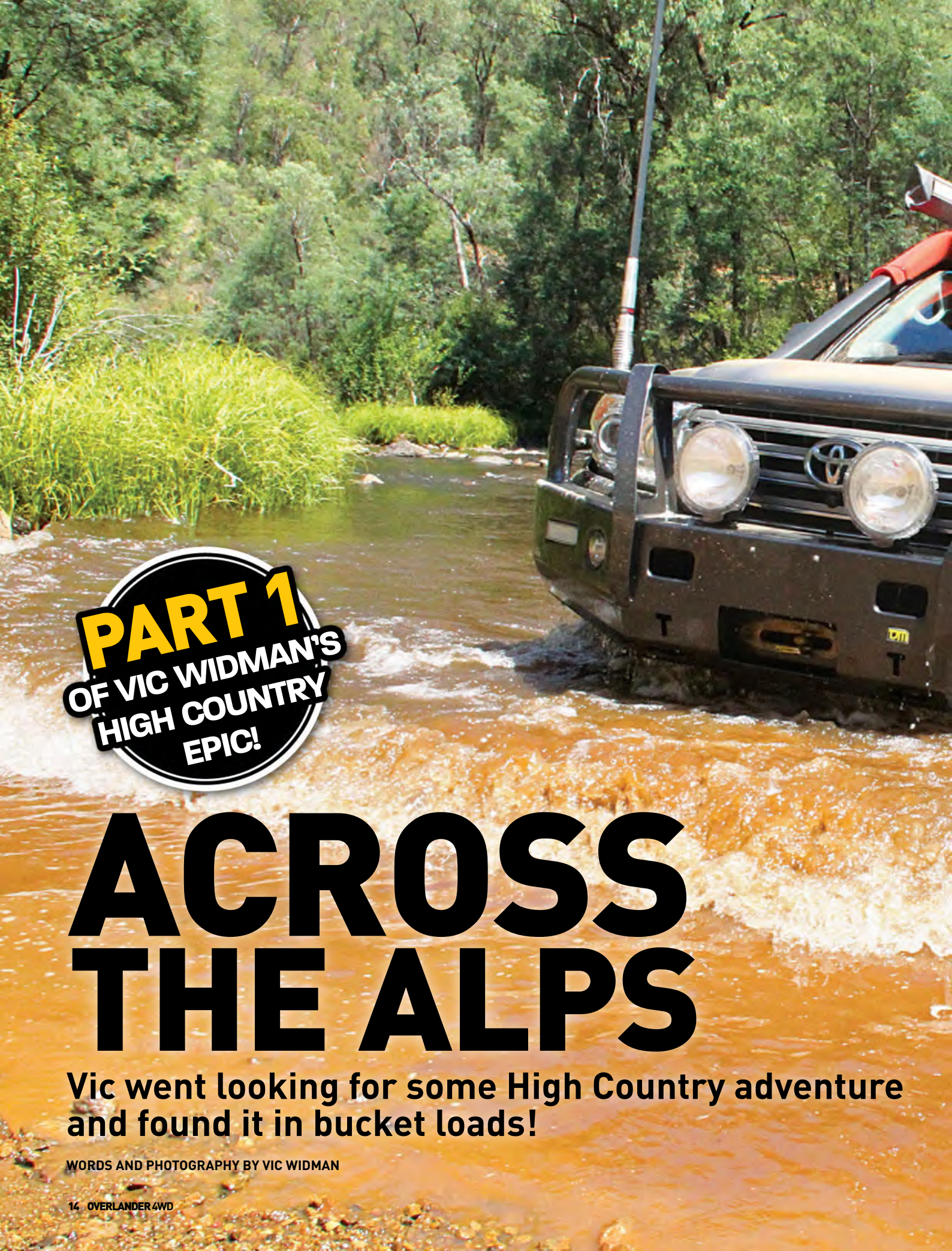
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PART 1
OF VIC WIDMAN'S
HIGH COUNTRY
EPIC!

ACROSS THE ALPS

Vic went looking for some High Country adventure and found it in bucket loads!

WORDS AND PHOTOGRAPHY BY VIC WIDMAN



Each February the beautiful town of Bright in Victoria hosts what is known as the Adventure Film Festival. This sees the gathering of a number of what is best described as adventure seeking people who have either filmed or photographed their exploits. The films and presentations include everything from people who have ridden a postie bike across the world, to an Australian who funded his own entry in the famed Dakar Rally - what an inspirational film that was! Then there were the four Australian guys who had all

become paraplegics as a result of various accidents who were now riding quad bikes half way across Australia. If you ever need to get inspired to do some out of the norm travel I highly recommend you visit the Bright Film Festival.

So, being akin to a bit of adventure traveller myself, and also dabbling in recording my exploits on film of late, thanks to John and Anne Morton at Lifestyle Video Productions, I assembled a small group of keen 4WDers in Bright in time for the festival. After an extremely enjoyable three days of films, talks and other presentations we were ready to set

off on our own adventure film trip across the Alps.

I've been travelling to the High Country since 1984 and whilst I have driven many of the tracks in this 4WD Mecca, there are still a few that I haven't put a tyre print on, so it was time remedy that.

One of the great delights of travelling in the High Country outside of holiday periods and mid-week is the total lack of other traffic on the narrow 4WD tracks; in fact we were lucky to see another vehicle at all. Fortunately, the one 4WD that we did chat to on our first track climbing up Goldie Spur out of the Buckland Valley



A tasty lunch under the old oak trees at Conglomerate Creek



John took a fall on the Butcher Country Track but reckons our medical attention was worse than the fall

ONE OF THE GREAT DELIGHTS OF TRAVELLING IN THE HIGH COUNTRY MID-WEEK IS THE TOTAL LACK OF OTHERS

WHERE:

Bright is found on the Great Alpine road just east of Wangaratta and is the jump off point for most of the great 4wd tracks in the Victorian Alps.

INFORMATION:

Located on the outskirts of the ACT, the Brindabellas offer a sensational taste of alpine camping with some absolutely cracking 4WD tracks on offer, as well as some spectacular views over the entire region from the mammoth Mount Corree.

CAMPSITES:

Camping is permitted throughout the High Country, there are numerous well known camping areas such as along the Buffalo River, in Wonnangatta Valley, at Howitt Hut and Bryce's camp. There is usually plenty of fire wood around but it will be scarce in Wonnangatta Valley, please abide by fire restrictions in summer. There is no need to book your campsite in advance too.

FUEL & SUPPLIES:

Fuel and all supplies are available at Bright only, the next fuel on Vic's trek was at Dargo and the tough and steep terrain saw his 200 Series consume 28L/100km so be prepared for figures like this.

was a tree lopping crew and they duly informed us that Goldie Spur track was closed ahead of us due to tree removal. These were dead trees, killed by past wild fires and now in danger of falling across the track. There are so many of them that the chances of one hitting the infrequent passing traffic greatly increases, so at huge expense these giant dead eucalypts are now being felled.

However, despite being defeated on the first track that we wished to explore (I had driven Goldie Spur several times previously but this time I was keen to follow the aptly named Mt Buggery Track which led off it) the tree felling crew gave us permission to go past their road closed sign as the tree felling was taking place past the Mt Buggery Track turn off and we would be quite safe to travel that route, it always pays to stop and have a yarn to passing traffic.

Goldie Spur track is extremely scenic, following the power lines on the ridge opposite Mt Buffalo and the Horn. You get great views from each clearing along its route. The track conditions are good too, requiring high range to help climb some of the steeper pinches. The Mt Buggery track is a little over 20km long and is a lot narrower than Goldie Spur - it is obviously a far less used route. Some of the climbs required low range but the surface is smooth and easily driven. We stopped for morning tea in a tree lined saddle and enjoyed the peace and quiet of the bush.

Just before reaching the end of Mt Buggery track we passed a grader driver, cleaning up the track, a friendly wave between us was exchanged. But when we reached the intersection with Camp Creek trail and I announced over the radio to my group that we were turning

left, the grader driver quickly came over the UHF advising that we couldn't get through that way due to some fire operations at the far end of Camp Creek track, again the locals saved us some time and fuel. All was not lost, as the opposite end of Camp Creek Track led out to Abbeyards Road which is the main thorough fare from Myrtleford into the Wonnangatta Valley and our intended overnight camp. We found a sensational spot beside the Buffalo River for lunch. Being February it was hot in the middle of the day and we were acutely aware of the likely presence of snakes around the river's edge.

By day's end we had reached the first crossing of the Wonnangatta River and although I had intended to head straight to the valley proper to camp near the old ruins, the peaceful and shaded clearing on the other side of this first crossing was just

too good to pass by so I declared camp for the night, and what a fantastic spot it was too! Second lesson when 4WDing: be prepared to change your plans.

Tuesday dawned fine and warm again, the weather always plays an important role in High Country travel. Even though I have seen Wonnangatta Valley, the Cemetery, and the old ruin site several times, this amazing location never ceases to provide enjoyment and serenity. Although reading the memorial stones in the small cemetery makes you realise it was a hard life down here for our early pioneers. We enjoyed morning tea under the shade of the old oak trees at Conglomerate Creek, and apart from one other camper about 300 metres away we had the Valley to ourselves.

Next we tackled the infamous Zeka Track, this time climbing up from Wonnangatta to the Howitt High Plains. My very first experience on his track was way back in 1984 when my first child was just one year old and we were driving a Subaru Leonie 4WD - yep I was crazy in those days for sure! Today the Zeka Track was easy, some steep pinches all requiring

low range but the most fascinating thing was a giant fallen tree that had come down from above the track, broken its back across the track with the top half spearing metres into the ground on the edge of the trail. First glance made you think the tree had simply broken off and fallen up the slope, but that was not the case. I'm glad I wasn't around when that occurred - the noise and impact must have been horrendous.

We reached Howitt Hut for lunch, and found that the march flies were early and their outboard motors and persistent landings kept us busy as we enjoyed the view over the snow plains that surround this beautiful location. I've had quite a few camps up here, and the most memorable always seem to involve high winds, sleeting rain and huddling around the fire in the Hut - this time it was magic with its blue skies and warm sun.

It had been over 15 years since I had driven the Butcher Country track and I desperately wanted to have a go at it. This not a track for the faint hearted and is found just west of where the Zeka Track joins the Howitt High Plains Road.

To start with, there were numerous mud holes to negotiate, some quite deep with the ruts and rocks causing occasional loud bangs under the Cruiser's belly. I was thankful for the Bushskinz bash plate that protected its soft underbelly. A couple in our crew struggled in some of these ruts but after some guidance and rock placement we all made it safely across the snow plains that the Butcher Country Track initially crosses. Then we began the steep and very rocky descent. This was quite a demanding track and for a couple in my group this was their first experience at fair dinkum 4WD terrain. During one rock ledge descent one of our companions managed to almost roll his Patrol. Our cameraman saw the Patrol coming at him, almost roof first and took a dive to avoid injury. Of course this didn't work on the steep and rocky track and he managed a nasty head wound as he hit the deck. The Patrol landed safely back on all four wheels but our cameraman was a little worse for wear. I was down a bit further and knew that this track was going to be a huge challenge especially as we intended



The Zeka Track climbs steadily up to Howitt High Plains

**WHAT TO TAKE:**

There is no water available other than what's in the rivers, so make sure you bring plenty of drinking water and supplies. You'll also want to ensure you are fully prepared with recovery gear, as in the event of a bit of rain the incredibly steep tracks will have you scrabbling for traction.

BEST TIME TO TRAVEL:

Late November to late May - avoid wet weather and high fire danger periods.

TRIP STANDARD:

This is tough 4WD terrain in places, adverse weather changes even the easy hills into slippery nightmares. The toughest track on this section of Vic's trek was no doubt the Butcher Country track and it should only be attempted by experienced drivers in well set up 4WDs. Towing an off road trailer would be difficult on some of the trails and is not recommended.

RESTRICTIONS AND PERMITS:

No permits are needed but be aware that many of the tracks Vic used in this story are closed from mid-June to early November.

CONTACTS:

Alpine National Park
W: www.parkweb.vic.gov.au

Adventure Film Festival
W: www.adventurefilmfestival.com

I KNEW RIGHT FROM THE BEGINNING THAT THIS TRACKS WAS GOING TO BE A HUGE CHALLENGE



There are lots of fantastic lunch stops along the Buffalo River

WE SAW THE PATROL COMING AT US, ALMOST ROOF FIRST AND TOOK A DIVE TO AVOID INJURY



Inside the Howitt Hut is very cosy, especially on a cold day



to come back up it the next day. So with John having what turned out to be a minor head injury, we turned around and headed back to the safety of the Howitt Road. Not defeated just deterred.

But we turned a bad situation into a good one as we found a fantastic campsite along the Howitt Road at Bryces Camp. We made camp, patched up John who now was feeling much better, got a nice fire going as the weather had cooled down and planned our next day's adventure which would take us up to the top of Mt Wellington, another unplanned destination that proved to be a real hit. But more on that next month! ■

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- IS YOUR COMMON-RAIL A TICKING TIME-BOMB?
- DO YOU TRUST THE RELIABILITY OF YOUR CRD?
- DO YOU THINK MAINTENANCE IS TOO EXPENSIVE?
- IS YOUR CRD STARTING TO GET A LITTLE RATTLY?
- MAYBE IT'S TIME FOR NEW INJECTORS - BUT AT \$800 A THROW - ARE YOU BEING RIPPED OFF?

A man with short brown hair and a beard, wearing a tan button-down shirt and blue jeans, is smiling and looking down at a clear plastic container on an orange workbench. The container holds some white foam packing peanuts. To his left is a white utility vehicle. The background is a cluttered workshop with shelves of boxes, a red tool cart, and various mechanical parts.

WILL COMMON-RAIL ENGINES LAST?

We bring together Australia's top diesel experts to bust (and confirm!) the myths around the modern common-rail diesel engine

WORDS BY STEVE COLLINS, PHOTOGRAPHY BY WES WHITWORTH

OVERLANDER 4WD 23

- Did you know it only takes one bad batch of fuel to destroy your engine?
- Will CRDs go the distance?
- Why are experts worried about injector and turbo life?
- Would you know if your engine was about to blow up?

Twice the power - twice as many kilometres out of a tank - twice as likely to blow up. That's what many are saying about the new breed of common-rail diesel engines. Are modern diesels becoming like air craft? Are they now too complicated and at the risk of falling out of the sky if even the smallest issue arises?

There's no hiding that there are some common-rail engines out there - extremely popular ones - with some pretty serious issues. Sure, there's a long list of mechanical diesels that've had their share of dramas too, but experts are seeing an alarming number of modern common-rails fail, racking up some hefty repair bills along the way. Think about it - a set of big-ends on a 1HD-T 80 Series costs what, \$400? A set of dead injectors on a new common-rail can cost upwards of \$3000. Sure, they pull like a freight train, have an incredible towing ability and return economy figures that'd leave any mechanic diesel for dead, but what good is any of that if it leaves you stranded in the middle of the Simmo?

So here's the question, is common-rail injection the devil it's made out to be, or can things be done to a common-rail 4WD to make them as reliable as any? People said coil springs were the end of 4WDs when they started replacing leaves. Everyone's always worried about new technology lasting, but this article's going to sort out, once and for all, whether it's fact or fiction.

This time we've teamed up with five of the country's leading diesel experts to help arm you with the cold - hard - facts. We've cut through the hype so you can see just how easy it is to safe guard your investment and save \$\$\$ in the process. So grab a tinny, go out to the shed and pull up a milk crate. If there's one thing that could save you serious coin this year - it's this right here!



THE EXPERTS!

There are few more qualified in common-rail diesel repairs and upgrades than our panel of experts



ANDREW LEIMROTH
BERRIMA DIESEL

Andrew's the pinnacle of small-town 'service with a smile', and one of the most trustworthy blokes we know. Andrew boasts 65 years of combined industry experience he shares with his father, Reinhard Leimroth. The man behind DP Chip; Andrew specialises in all aspects of 4WD diesel fuel injection including injector servicing, fuel pumps, turbocharging, exhaust packages, dyno tuning, diagnostic testing and a whole heap more.

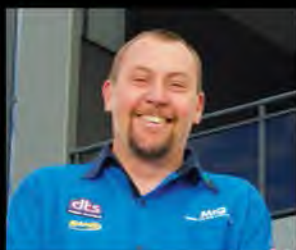


SCOTT WOOD
DENCO DIESEL

Scott's been in the diesel game longer than most. He's been with Denco Diesel for more than 30 years and specialises in all things common-rail. Denco have made a name for themselves as specialists in diesel fuel injection and turbocharger systems, and are credited as a premium service dealer for Denso, and a Bosch diesel centre.



Out with the old and in with the new. The bigger, louder and more reliable TD42 (right) is a distant memory nowadays, making way for the new breed of smaller, harder-revving common-rail ZD30s (left)



TONY MARTIN
MTQ ENGINE SYSTEMS

Tony's the Brand Manager at MTQ's Toowoomba service center, and he's also responsible for training their national team of technicians. That in itself is no easy feat, because MTQ is one of Australia's largest diesel fuel injection and turbocharger aftermarket sales and service providers, which means, if there's a problem with a diesel 4WD getting around or an upgrade worth doing, Tony knows about it. Tony's been dyno tuning diesel engines for 14 years now, and is largely behind the development of the Rapid performance module.



MATT BAILEY
BAILEYS DIESEL GROUP

Matt Bailey from Baileys Diesel Group has gone where few dare to tread, challenging industry heavyweights to help deliver you better competition and pricing. We're talking about a team that engineers and builds millions of dollars worth of specialist machinery just because it's going to get a better result (they've got 5 patented diesel test benches you just won't find anywhere else in the world). Matt and his team have pioneered common-rail injector blue-printing - which is similar to rebuilding - only they give it the Baileys upgrade and whack on a warranty that'll beat any OEM manufacturer. More on that later in the article.



DAVE COX
MT DARE HOTEL

Here's a bloke who needs no introduction. You all know him by now as the owner of the Mt Dare Hotel on the western side of the Simpson desert. But he's also one of the vehicle recovery operators for the surrounding desert areas, and so he sees firsthand what goes wrong with modern 4WDs in the outback. He's also a fuel retailer and he uses a new CRD LandCruiser as his recovery vehicle, so there are few more qualified to weigh in on the common-rail debate than Dave.



"MOST ENGINE FAILURES ARE ENTIRELY PREVENTABLE"



HOW COMMON-RAIL DIESELS WORK

To understand what goes wrong, you first need to know what makes them tick

- 120 years ago, Rudolf Diesel invented the first ever compression-ignition engine
- In 1995, Denso offered the first commercial common-rail diesel fuel injection system
- Bosch followed suit in 1997
- In the mid-2000s common-rail technology hit Australian shores, bringing with it a wave of powerful, efficient and quiet 'oilers'

COMMON-RAIL TECHNOLOGY

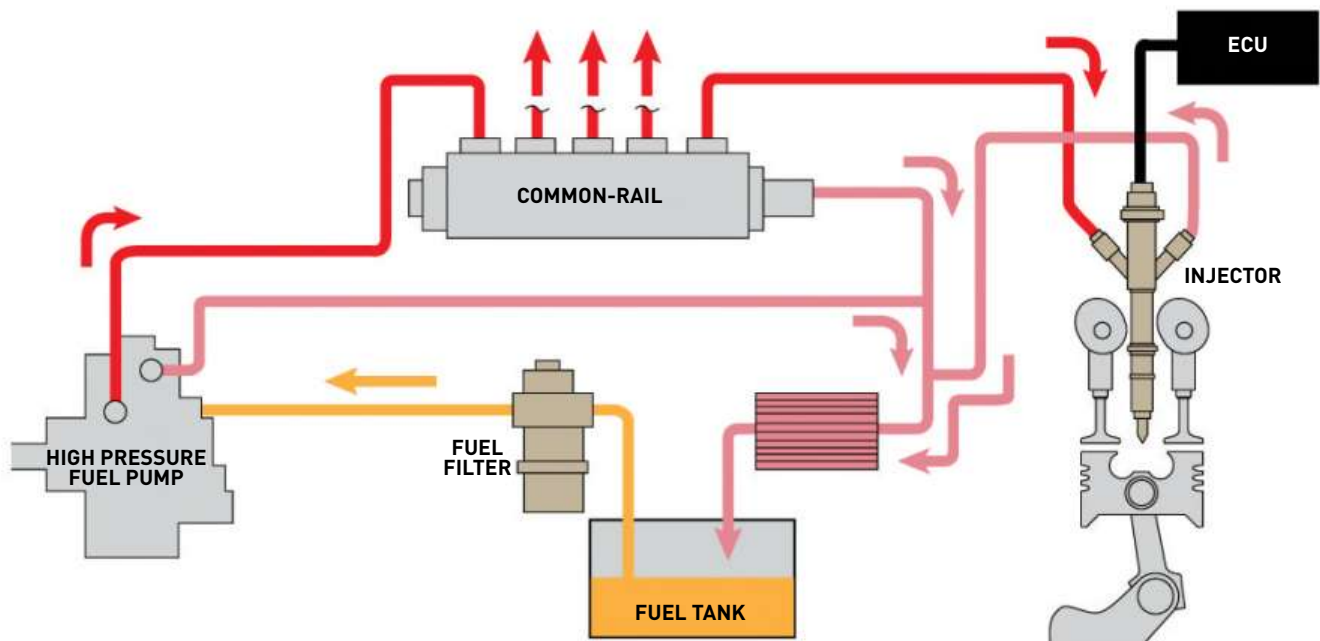
Common-Rail Diesel (CRD) engines themselves are essentially the same as any modern piston engine. Where common-rails differ is that the injector pump supplies fuel to one fuel rail common to all cylinders (hence the name common-rail), as opposed to generating pressure individually for each injector like older mechanically injected diesels. So in a sense, a CRD fuel system is more like to an EFI petrol engine than it is a traditional diesel.

The injector pump continually charges this 'common rail' with high pressure fuel. The injectors are connected to the fuel rail via high pressure lines, but instead of fuel pressure itself opening the injector like a mechanically injected diesel, the Engine Control Unit (ECU) controls when and how long the injector is opened by the use of an electronic solenoid inside the top of each injector. The ECU can also vary fuel pressure, timing and boost pressure, depending on the engine's load, via a handful of pressure sensors and regulating valves.

THE SECRET TO A POWERFUL & FUEL EFFICIENT ENGINE

The secret is a more efficient fuel burn that high fuel pressures allow. Higher pressure means more fuel can be injected in a shorter period of time, even at high RPM. High fuel pressures also mean better fuel atomisation with better and more precise fuel metering. These pressures can be as high as 40,000psi in a common-rail, where older mechanically injected diesels were running fuel pressures of only a few thousand PSI.

Running such high pressures also enables a CRD to utilise pulse injection, where the ECU injects multiple short bursts of fuel (most commonly 3-4 times per rotation, but can be as high as 5), rather than one single squirt of fuel like in older mechanical diesels. This injection methods means the fuel delivery is more precise, the burn is smoother, a lot more controlled and sustained over a larger portion of the pistons power stroke. It also helps to remove traditional diesel 'knock' - resulting in a very attractive engine package for consumers.



HOW CRD INJECTORS WORK

Inside a CRD injector is a spindle (or polished rod) that moves up and down a two-part chamber to control the flow of fuel. As fuel enters the injector, it makes its way into both chambers - the upper and the lower chamber. At this point, the pressures in both chambers remain equal.

The upper chamber is often referred to as the control plunger, which is connected to an electronic solenoid controlled by the ECU. As the ECU energises the solenoid, it pulls the control plunger upwards, releasing a small amount of fuel into the fuel return line, creating a pressure differential between the two chambers.

With higher fuel pressure now in the lower chamber, the spindle is pushed up off its seat and fuel is injected into the cylinder through precisely measured holes in the injector nozzle. The ECU actuates this sequence several times per injection cycle, so it all happens in a mere fraction of a second.

There's also a new generation of common-rail injectors starting to make their way into 4WDs, called piezo-electric injectors. This technology utilises a small piezo crystal, that when energised, expands, lifting the spindle off its seat and injecting fuel. Its key benefit is that it operates much faster than conventional solenoid injectors, allowing even more precise control, but the technology is so new, it's not known how it'll fair long-term.

Where a lot of issues stem from in any common-rail system is that the clearances inside the fuel system of a common-rail diesel are as small as 2 micron, or 0.002mm. That means it doesn't take much by way of fuel contamination for these parts to fail.



Here you can see the insides of a common-rail injector, when located in the cylinder head



Matt from Baileys Diesel Group was the first in the country to offer a reconditioned injector, cheaper than OEM, and with a longer warranty

WHY THE HIGH PRICE TAG?

MATT BAILEY - BAILEYS DIESEL GROUP

"Two things cause high repair costs - lack of competition in the market and a lack of knowledge by repairers. Competition in the market will come in time, because at the end of the day the technology is so new. And when it does, prices will start to drop.

The second biggest problem is lack of knowledge in the industry, or ill-equipped mechanics who just don't know what they're dealing with. Too many rely on fault codes to narrow down on a problem and simple 'repair by replacement' which ends up costing you more.

Before we invested millions of dollars in specialist equipment, no one in the country was rebuilding common-rail injectors. They said it couldn't be done. But we knew injector rebuilding was 'the done thing' in Europe, and in the two years since our injector reconditioning project began, we've successfully rebuilt every 4WD common-rail diesel injector in Australia to a higher spec than factory. We offer a longer warranty than OEM type of replacement parts.

In the last 12 months alone we have rebuilt over 10,000 injectors. We also do this at a fraction of the price of an OEM part - for instance, we're able to offer blueprinted D-4D HiLux injectors for \$325 with a 3 year warranty."

ARE THEY REALLY AS 'HIGHLY STRUNG' AS THEY'RE MADE OUT TO BE?

SCOTT WOOD - DENCO DIESEL

"With improvements in metal composition and engine design, we see no issues with CRD longevity, but it must be understood that engines are being designed to last for a given period. As engines wear, emissions are affected and a common-rail fuel system can compensate to a degree for certain conditions.

CRD engines are running up to 30psi of turbo boost pressure, but most 4WD applications are operating between 12-20psi. The engines are designed with this in mind and have relatively no issues unless modifications are performed that effect boost pressure outside of the engine's capacity. For instance, increasing boost can cause the turbocharger to go into an over-speed situation and result in failure due to the physical forces applied to the compressor and turbine wheels."

WHAT ARE THEIR DOWNSIDES?

TONY MARTIN - MTQ ENGINE SYSTEMS

"Common-rail diesels have many sensors which can fail and are more expensive to repair. The systems that operate the vehicle are very complex, and difficult to diagnose and repair if you're in the middle of nowhere. It is not so much the engine that is complex, it's all of the extra componentry that is required to make the vehicles comply with emissions regulations. Common-rail fuel systems also require very clean fuel of a very high quality for the system to last."

COMMON-RAIL INJECTION SYSTEMS COMPARED

Are all common-rail fuel systems created equal?



WHAT DIFFERS BETWEEN THE BRANDS?

SCOTT WOOD - DENCO DIESEL

"Most common-rail systems operate on similar principles and not a lot varies. Some Bosch systems have a cylinder cut out on the pump that stops one cylinder pumping and regulates the pressure via this control as well as a pressure regulating valve on the rail assembly. Others just have a pressure regulating valve.

Most late systems now regulate the pump as well as the rail to ensure that pressure is accurately regulated and has protection from over-pressurisation in-case one system fails. The injectors are individually controlled by the ECU and can perform multiple pre, post and main injections depending on load and engine conditions. Fuelling can be changed between cylinders to aid with smoother running, noise reduction or a power imbalance."

DENSO VS BOSCH INJECTION - THE TWO BIG PLAYERS

ANDREW LEIMROTH - BERRIMA DIESEL

"Bosch began the legacy of diesel injection. Denso introduced common-rail injection. These days, both are virtually the same and are following the same principles.

Bosch systems don't seem to have as many issues, at least at the moment, as the Denso common-rails. But it is truly hard to say whether one is better than the other because the technology is so new. Give it another ten years and we'll know for sure.

If replacement parts for either brand need to be sourced, owners are often forced to buy genuine, as each manufacturer makes specific systems for the engine it is used in, and so far there is little aftermarket support so you're forced to go back to the same manufacturer if there is a fault."



WHICH SYSTEM THEY USE

TOYOTA LANDCRUISER 1VD-FTV (4.5L)	DENSO
TOYOTA HILUX 1KD-FTV (3.0L)	DENSO
NISSAN PATROL ZD30 (3.0L)	BOSCH
NISSAN NAVARA YD25 (2.5L)	DENSO
NISSAN NAVARA 550 ST-X (3.0L V6)	BOSCH
MITSUBISHI TRITON (2.5L)	DENSO
MITSUBISHI PAJERO (3.2L)	DENSO
LAND ROVER DEFENDER TD4 (2.4L)	DENSO
LAND ROVER DISCOVERY TD5 (2.5L)	DELPHI
JEEP WRANGLER (2.8L)	BOSCH
JEEP CHEROKEE (3.0L)	BOSCH
FORD RANGER (3.2L)	SIEMENS
VW AMAROK (2.0L)	BOSCH
ISUZU D-MAX (3.0L)	BOSCH
HOLDEN COLORADO (2.8L)	BOSCH

*Some engine variants may vary depending on year of manufacturer

TOUGHEST COMMON-RAIL MOTORS OUT THERE

ANDREW LEIMROTH - BERRIMA DIESEL

"Hard to nut it down as they all have a variety of issues."

4.5L V8 TOYOTA LANDCRUISER

"The Toyota V8 CRD is very under stressed so it's probably the TD42 of the CRD engines."

2.5L NISSAN NAVARA/PATHFINDER

"We have one that's travelled 200,000km across this country. Serviced regularly with no issues."

2.5L MITSUBISHI TRITON

"One of the older CRD engines and is trouble free from our end."

3.2L MITSUBISHI PAJERO

"Another older CRD engine we see little to no issues... Don't buy the model with diesel particulate filter, though!"

3.0L ISUZU D-MAX

"Isuzu....truck proven."

TONY MARTIN - MTQ ENGINE SYSTEMS

"Most common-rails will respond to upgrades. It is not unreasonable to expect gains of 20% or more by fitting a chip and exhaust package."

3.0L MAZDA/FORD RANGER

"Responds well to a chip. Made the highest HP as tested by 4WD Action with a Rapid module."

3.0L ISUZU D-MAX

"Responds well to performance module and exhaust. Hardly ever see these in the workshop."

2.5L MITSUBISHI TRITON

"Has issues with carbon build up in the intake manifold so I recommend regular use of intake manifold cleaners that are suitable for diesel engines. But otherwise a solid performer."

3.0L D-4D HILUX

"Injectors aside, they are a tough motor. The best thing about the Toyota is when the vehicle has a fault it, in most cases, will not shut down the vehicle completely - it goes into a reduced power mode but it will still run."

What are the toughest common-rail motors out there? The ones that rarely break down, respond best to modifications and are rather forgiving...

MATT BAILEY - BAILEYS DIESEL GROUP

"Anything with a Bosch fuel system seems not to suffer the same reliability issues as others."

3.0L 4JJ1 ISUZU D-MAX/COLORADO

"We don't see many of these at all. We only ever see these if the fuel has been contaminated, which is a problem that can affect any vehicle."

4.5L 1VD-FTV TOYOTA LANDCRUISER

"These engines are a lot less stressed than the D-4D 1KD (HiLux) engine. They run lower fuel rail pressures, the engine RPM are lower and the average injector life is roughly 250,000km, as opposed to 175,000km for the 1KD."



MOST PROBLEMATIC ENGINES

Now look, we've got to take a second here to point out that every engine, at some point, experiences dramas. Search the word 'recall' online and you'll see manufacturer experiences issues. So when it comes to this sort of thing, knowledge is king. And as a 4WD Action reader, we're giving you the knowledge of what goes wrong so you know what to look for, how to fix it, and how not to get ripped off in the process.

THE POTENTIAL FOR ENGINE FAILURE IS HUGE!

MATT BAILEY - BAILEYS DIESEL GROUP

"The potential for small problems to turn into something more costly is huge in any common-rail. The problem we face with common-rails is there's a real risk, in certain situations, of your engine being flooded with fuel which can lead to cracking pistons.

The same thing couldn't happen in a mechanical fuel injection system. The worst it could do was squirt in the small amount of fuel pressurised in that one injector line. Common-rails are constantly pressurised when-ever the engine is running, so all it takes is minor scoring or a few foreign particles to find their way into the injector before it begins to stick, flooding the cylinder with more fuel than it needs, causing it to run hot."

THE ENGINES WE FIX MOST...

ANDREW LEIMROTH - BERRIMA DIESEL

3.0L ZD30 NISSAN PATROL

"The motors themselves seem quite durable these days, but it's still experiencing ancillary issues (leaking manifold gaskets). It would appear to be a good choice as long as you don't intend towing heavy loads meaning the engine will be under full power all the time."

3.0L D-4D TOYOTA 1KD-FTV PRADO/HILUX

"With the number of injector issues that owners are experiencing with this motor, it's starting to make the ZD30 Patrol seem reliable. We had 150 emails within a few days from owners with problems after we ran a recent Facebook awareness post about the ongoing issues. Coincidentally a few months later Toyota 'quietly' recalled them, so we hear."

What engines are undergoing repairs most often, and why?

WHAT EXACTLY GOES WRONG WITH THEM, AND WHY?

WHAT'S CAUSING THREE OF THE MOST COMMON CRD FAILURES AROUND?

3.0L NISSAN PATROL ZD30

The ZD30 has a reputation for cracking pistons. Unfortunately, there is not just one cause, it's a combination of lubrication issues, sudden turbo and cylinder pressure fluctuations caused by either a boost leak, a faulty MAF or boost sensor, and even a build-up of carbon on the inlet valve stem and port areas. It's a recipe for disaster in anyone's book.

Tell-tale signs of engine failure are coolant blowing out of the radiator cores or expansion tank, poor idling, lack of power and large chugging plumes of white smoke from the exhaust.

The trick to preventing the problem is to use low-ash engine oil, ensure the air filter is kept clean, ensure the air flow meter, boost sensor and intercooler are working correctly and not leaking or contaminated. Fit an oil catch can to prevent oil vapours contaminating the air flow meter. Also remove and clean the EGR circuit regularly - it's known to contribute to the problems.

3.0L TOYOTA HILUX/PRADO D-4D 1KD-FTV

Cold knocking can be a problem with this motor, which is caused by the injector spindle sticking open when cold. This can lead to that cylinder being over fuelled which makes it run hot, and if left unchecked, will ultimately crack a piston.

There's also been a run of leaking injector seals on this motor. These seals separate the combustion gases from the oil, and if they leak, can lead to excessive carbon (soot) contamination in the oil, which owners may not even notice. It may blow smoke on start up under certain conditions, e.g. if you park over night with the nose down. But other than that it can be hard to pick. Replacing the seals is the only fix, but regular 5,000km servicing will also go a long way to preventing engine damage.

4.5L 1VD-FTV TOYOTA LANDCRUISER

There are largely exaggerated stories that the 1VD-FTV has an oil usage problem. Simple truth is, it's not uncommon for any engine to use oil for up to the first 30,000km or so - it's not a 'fault' - it just takes time for components like seals and piston rings to bed in completely. It can be made worse in the Toyota V8 for two reasons.

The 1VD-FTV requires very specific C3 grade 5W-30 fully synthetic engine oil, and if you deviate from this grade of oil the engine will start to use oil. They also get pushed harder than other engines by their owners. As an agricultural vehicle, they're often tasked with towing heavy loads or lugging tray loads of gear, so a little blow-by is to be expected until everything has settled.



This is the D-4D injector seal everyone is talking about. When this lets go, carbon makes its way into the oil and can, over time, block the oil pickup

30 OVERLANDER 4WD



Notice the carbon build up on these D-4D injectors, it's a result of a failed injector seal, that separates combustion gases (carbon) from the engine oil





MATT BAILEY - BAILEYS DIESEL GROUP

2.5L YD25 NISSAN NAVARA

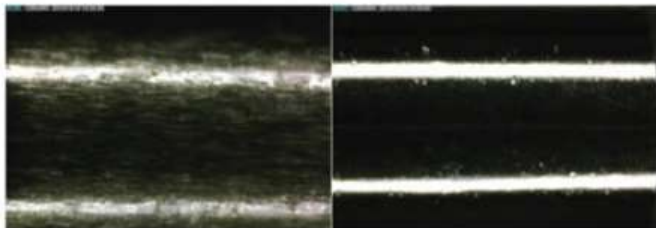
"EGR valves literally fall apart on these motors. You'd swear the engine had failed because it starts bellowing white smoke, but really all that's happening is the exhaust gas is being pumped straight into the intake, suffocating the combustion.

The suction control valve in the fuel pumps can be temperamental. Even when changing the fuel filter you often need to go in and reset the system.

D40s specifically are highly sprung from the factory, so you often don't see massive gains out of tuning these engines. A/F ratios and boost pressures are already quite high, so the only way to get a significantly power increase is to replace the turbo."

4.5L 1VD-FTV TOYOTA LANDCRUISER

"It's not worryingly common, but we have seen a number of fuel tanks rusting out, even with no evidence of water contamination. It's very unusual. This then goes through to the fuel system and causes damage."



This is an injector spindle under a microscope. On the left you can see scoring of the injector spindle, the right is what a new one looks like. When it gets bad enough, it sticks open, causing the dreaded 'injector knock'.

TONY MARTIN - MTQ ENGINE SYSTEMS

"All modern common-rail 4WDs have their own special problems. Some can be overcome and rectified easily, some are more difficult."

ZD30 3.0L COMMON-RAIL PATROLS

"We see plenty of turbocharger failures and plenty of manifold gasket leaks due to warped manifolds. This engine also has some injector problems and fuel rail pressure release valve issues, mass air flow sensor problems and EGR faults."

D-4D HiLux/Prado

"Well-known injector problems here. The HiLux has also been known to have some issues with the electronic motor on the turbo which controls the VNT and the LandCruiser has some issue with injectors and turbochargers as well."

3.2L Ford Ranger/Mazda BT50

"These are still a very new system and being a Peizo injection system, they are very sensitive. Fitting aftermarket accessories can cause you grief due to voltage changes. In this engine, the injectors are separated from the oiling system. If they burn out the seal they blow soot up the body of the injector and not into the engine oil."

THE MOST COMMON CAUSE OF FUEL CONTAMINATION IS NOT A SERVO

DAVE COX - MT DARE HOTEL

"I've had a few CRDs but never had any trouble with them. I've also been accused of selling contaminated diesel that has resulted in damage to a CRD injection system. This is very difficult to prove and was unlikely to have been the case. With the amount of vehicles that we refuel, including ours, a contamination would not be restricted to just one incident, there would be more.

The source of contamination is mostly perceived to be the fuel retailer, when in fact it's probably due to a careless owner. Jerry cans are the most common source of fuel contamination, with steel ones at the top of that list. Check them thoroughly and clean them if required prior to use, there may be rust, algae, or dirt in them.

The fuel filler is the next culprit, especially on a ute. Try to clean as much dirt away prior to removing the cap.

As for CRD reliability. I rarely keep a 4WD for longer than 4 years or 100,000km. Reliability is paramount and I can't afford to break down, after all, who rescues a rescuer?"

WHAT'S THE BIGGEST KILLER OF ANY COMMON-RAIL DIESEL?

MATT BAILEY - BAILEYS DIESEL GROUP

"It's simple, fuel contamination and poor servicing. Because the tolerances in a common-rail fuel system are extremely tight, any contamination is going to cause damage. Once scoring occurs in the pump or injectors, it's too late - the damage is done. And preventing it is often as simple as installing a quality secondary filter and only filling up at a reputable service station.

Too often early warning signs are missed because inexperienced repairers don't know what they're looking at, so the engine is being driven into the ground while the owner is completely unaware. Once the engine light comes on - the damage has already been done. Common-rails are not like previous diesels. You can't have the 'she'll be right' mentality. Get yours checked and keep it maintained, and it'll last forever."

That ain't mud in the fuel - it's algae!



SERVICING YOUR COMMON-RAIL

Is it really that dangerous to work on your own common-rail, or is it nothing more than a scare tactic? And how much of it can you work on without diagnostic computers?

CAN YOU WORK ON A CRD YOURSELF?

ANDREW LEIMROTH - BERRIMA DIESEL

"Generally there is nothing to touch other than normal service items like filters so it's not a problem. In the early days of CRD release there was a lot of talk about the safety around the fuel injection parts due to dangerously high pressure. Basically this faded away as people realised that any fuel pressure areas touched had pressure but very little volume."

WHAT ABOUT DIESELS THAT CLAIM 15,000KM INTERVALS? SHOULD I SERVICE MINE EVERY 5,000KM?

"Manufacturers aren't interested in hearing their engine lasted 300,000km+, but you are. I recommend a flexible mindset to oil changes and service work. Do short runs over 6 months and change the oil every 5,000km. If you do quick mileage with little stress on the vehicle in 6 months, then you can stretch it anything up to 10,000km. Don't forget - you change oil because it's saturated with carbon deposits (among other things). The fact that CRD engines may run cleaner is one reason for the extended oil change idea. But like we're seeing with the HiLux D-4D engines, regular oil changes will almost certainly prolong the life of any engine."

ARE HIGH-PRESSURE FUEL LINES DESTROYING YOUR INJECTORS?

MATT BAILEY - BAILEYS DIESEL GROUP

"Our testing is starting to show that these lines are starting to erode from fuel cavitation at around 100,000-120,000km. What metal breaks off the inside of these lines has one place to go, and that's through the injector. So, like needing better filtration, it's obviously ideal that this is avoided as much as possible, and replaced before they become a problem (like replacing your timing belt). They're not as expensive as many people think, too."



REPAIR COSTS COMPARED

Keep in mind that prices vary greatly depending on what parts are being used (rebuilt or new), labour rates and extent of damage. Here's what you can expect;

	NISSAN 3.0L ZD30 CRD	NISSAN 2.5L YD25	TOYOTA 3.0L 1KD D-4D	TOYOTA 4.5L 1VD-FTV	MITSUBISHI 2.5L CRD
COST OF INJECTORS	\$2,500	\$3,000	\$3,000	\$6,500	\$3,000
COST OF A PUMP REBUILD	\$4,000	\$3,300	\$2,800	\$3,000	\$2,800
COST OF AN ENGINE REBUILD	\$10,000- \$12,000	\$10,000 +	\$10,000 +	\$15,000- \$20,000	\$8,000 +

SERVICING COMMON-RAILS WITH A DIESEL PARTICULATE FILTER

TONY MARTIN - MTQ ENGINE SYSTEMS

"Some engines require special oil (which costs more) because of engine emissions systems like the diesel particulate filters. If you use the wrong oil you can cause the filter to block up and fail prematurely. As modern diesels are a little more complex than the old push-rod engine, using the correct oil is more important to adequately lubricate bearing surfaces and to avoid engine failures."

HOW COME REPAIRS COST SO MUCH?

SCOTT WOOD - DENCO DIESEL

"Repair costs are relative to older systems with the exception of contamination. Contamination in a common-rail often damages all of the components it comes in contact with, and all of these parts must be replaced to prevent further failures. If injectors fail as the result of contamination there is no point replacing just these units as they are at the end of the line and will be re-contaminated with the particles that are still present within the pump, rail and lines."

If any repairs are required, it's essential it's carried out in a purpose built clean room, filtered to 0.5 micron, to ensure that the product will not fail. Testing of these components requires specialist equipment with protective cages over the benches to protect the operator as pressure equal to what is provided on the vehicle, up to 2200 bar, needs to be generated to check the operation of the component against the manufactures specification. Unfortunately this sort of stuff doesn't come cheap."



CHIPS vs. FLASH TUNING

The secret to unlocking more power, or a first-class ticket to an engine rebuild?

Common-rail turbo diesels incorporate a dedicated Electronic Control Unit (ECU) as the brain-box behind the fuel system. Various sensors monitor engine parameters like fuel rail pressure, engine RPM, load, exhaust temps, boost pressure and air temperature, and convey these messages to the engine's ECU. The ECU processes them in combination with a pre-programmed fuel map, which enables the ECU to determine the correct amount and time to inject the fuel, depending on what else is happening.

Both performance chips and flash tuning work to achieve the same result, in that; they both enable you to make changes to fuel timing, injector duration and rail pressure in order to increase the engine's performance.

WHY AREN'T THEY LIKE THAT STOCK?

Most manufacturers err on the side of caution and tune their engines conservatively to allow for variations in fuel quality and to ensure the reliability of the engine and ancillaries like the turbo and injection system.

Some also opt for a safer tune so they're able to extend their service intervals. The more power an engine can make lazily the better, because then the manufacturer can extend service intervals and draw you in by advertising lower maintenance costs.

WHAT IS ECU FLASHING?

Flash tuning enables tuners to re-write parts of ECU which control the fuelling, timing, boost pressures and safety features. Not all ECU flashing is done by plugging into the OBD port. Some vehicles require the tuner to open the ECU to connect to the pins that enable the ECU to be re-written. These changes often override the manufacturer's settings, meaning, you cannot revert back to factory settings if you sell the vehicle or something goes wrong. It's all for nothing if there is a software update issued by the manufacturer that is, unbeknown to you, uploaded to your ECU during a routine service. Instantly, you've lost your tune. And the only way to get it back is to take it back to the tuner to get the performance tune loaded in again - obviously at your expense.



HOW PERFORMANCE CHIPS WORK

Chips are an external module that interrupts or varies signals going to or from the ECU in order to get the engine to perform in a way the tuner wants. Chips do not change the manufacturer's original fuel map and most do not vary or override the ECU's safety parameters, but they can change the inputs or outputs to and from the ECU.

Unlike flash tuning, if you sell your vehicle, you can remove most diesel chips and sell it, or take it with you and fit it to another compatible vehicle.

ECU FLASHING/PERFORMANCE CHIPS AFFECT MY WARRANTY?

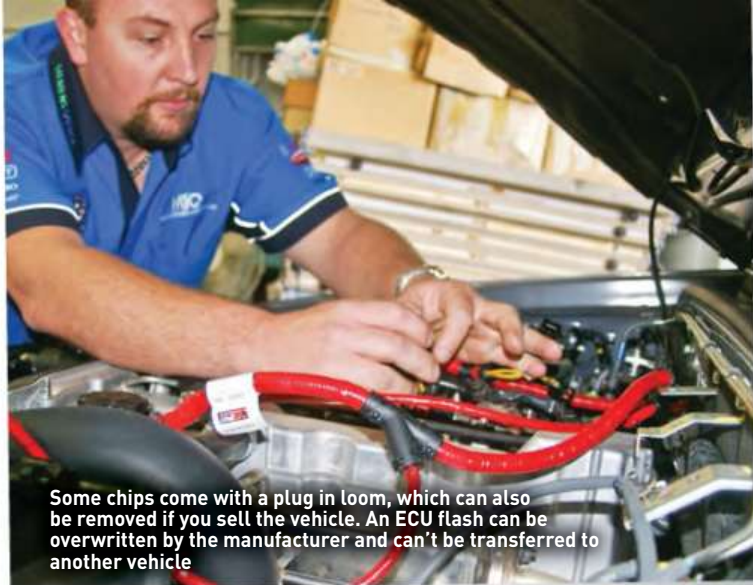
TONY MARTIN - MTQ ENGINE SYSTEMS

"All chips can affect your new vehicle warranty potentially. It often depends on the dealer and how they view the addition of a module or a re-flash. The advantage of a plug in performance 'chip' is that you can remove it and it does not leave a trace. The dealers can see when an ECU has been flashed."

HOW PERFORMANCE GAINS ARE ACHIEVED

ANDREW LEIMROTH - BERRIMA DIESEL

"A diesel performance chip allows you to tune an engine to widen its available torque range in one of two ways; by increase fuel rail pressure or extending the injection duration. By delivering more torque down low, your 4WD gets up and moving quicker, and you're able to get off the accelerator earlier to save fuel. Fuel economy comes from the driver, not the chip, because at the end of the day it comes back to your right foot; where your foot is, is where the fuel is."



Some chips come with a plug in loom, which can also be removed if you sell the vehicle. An ECU flash can be overwritten by the manufacturer and can't be transferred to another vehicle

CHIPPING YOUR COMMON-RAIL

MATT BAILEY - BAILEYS DIESEL GROUP

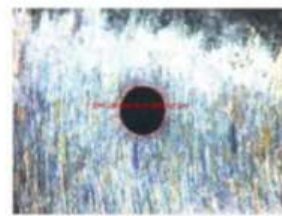
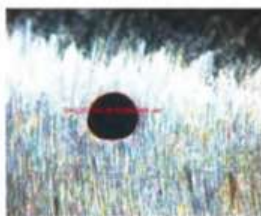
"Thinking about it logically, higher power output and better fuel economy (as most chips claim) is the holy grail for all vehicle manufacturers. If it was possible to do this and meet the reliability and emission constraints, they would have done this from factory."

With chips that increase rail pressure, firstly you cause the injector to wear out faster. The injector nozzle also suffers long-term. The increase in fuel pressure changes the atomisation of the fuel as it's injected into the cylinder, and the mixture may ignite too early or too close to the injector, resulting in the nozzle becoming super-heated. At high RPM it's not so much of a problem as the heat doesn't hang around, but at lower RPM the heat soaks into the injector nozzle, accelerating wear. In extreme cases the nozzle can absorb carbon and shatter if the temperatures get hot enough.

Chips that increase injector duration might make power, but they aren't as efficient in doing so, because a long injector duration means fuel is often still being injected while the piston is starting to move down the cylinder.

Chips are a highly personal choice, some people want more power regardless (I have a chip for example). But I'm also aware that it will have an impact on fuel system (and sometimes turbo) life, but it's an educated choice I make."

Photo Credit: Baileys Diesel Group



This is one of the precisely machined holes in the injector nozzle under the microscope. The left is excessively worn, the right is new

SHOULD I ALWAYS PAIR A CHIP FLASH WITH AN EXHAUST UPGRADE?

TONY MARTIN - MTQ ENGINE SYSTEMS

"This depends on the vehicle. Some vehicles respond well to the addition of an exhaust, but others see very little gain. You have to be careful of the size of the exhaust and that it has all of the parts that are needed to keep your 4WD legal, i.e.; cat converters and diesel particulate filters."

WILL COMMON-RAIL ENGINES LAST?

How will common-rail engines fare in 30 years time? And what can you do to make yours last?

WILL THEY SEE 30 YEARS?

ANDREW LEIMROTH - BERRIMA DIESEL

"The engine may but will the rest of the stuff running it? With good maintenance it should."

MATT BAILEY - BAILEYS DIESEL SERVICES

"Yes, with maintenance."

SCOTT WOOD - DENCO DIESEL

"With quality fuel the systems are reliable. We've seen them last to 500,000km without incident."

TONY MARTIN - MTQ ENGINE SYSTEMS

"This will depend on the vehicle and how it is maintained. My concern is the electronics lasting and parts availability for people to keep them maintained and on the road."

DAVE COX - MT DARE HOTEL

"I think that machining accuracy and tolerances in modern engines has helped to make them last mechanically. Electronically is another issue and to have electronics last 30 years may be a tall ask. If one of these items fail then that could mean the end of your engine, as a repair may cost more than its worth."



No prizes for guessing what these are... One heavily blocked fuel filter, and one fresh one ready to go in. Replacing your fuel filter regularly is the only way to make your CRD last!

HOW TO EXTEND THE LIFE OF A COMMON-RAIL MOTOR

SCOTT WOOD - DENCO DIESEL

"Water ingress is the main cause of failure in all common-rail systems. Simple things can be done to prevent these failures like using only genuine filters, and regularly inspecting the fuel system to ensure water is not present."

As most common-rail pumps control pressure by regulating the fuel entering the pumping plungers, we recommend that devices that cause additional restriction, such as extra filters, not be fitted. A water trap with an internal diffuser can be fitted to most vehicles which are designed to catch water with minimal restriction. Some of these are available with sensors to alert the driver that water is present. With quality fuel the systems are reliable. We have seen some vehicles exceed 500,000km without incident."

DON'T HEAD OFF-ROAD WITHOUT...

ANDREW LEIMROTH - BERRIMA DIESEL

"It's almost essential these days to carry a diagnostic tool that allows you to reset fault codes if a problem arises while you're off-road. Often, the computer will put the engine into a 'fail safe' mode if a fault occurs regardless of the severity, and it could simply shut the engine down. It's the engine's way of protecting itself, the problem is, it can leave you stranded. A diagnostic tool like the EDS allows you to monitor exactly what the engine is doing in real time, and also allows you to read and reset fault codes."

THIS GREAT DEVICE CAN SAVE YOU THOUSANDS



HOW TO MAKE YOUR INJECTORS LAST

MATT BAILEY - BAILEYS DIESEL GROUP

"I think that the best thing is to get better filtration. We strongly recommend 2 micron secondary filter systems as they have better filtration (less foreign particles through the injectors means a longer life) and additional water trap capabilities."

The container Matt is holding is full of injector spindles that have worn. Each one represents a failed or sticky injector, and that's just one very small batch!



Two things will prolong the life of your engine; regular servicing and good quality fuel

FEATURE COMMON-RAIL DIESEL ENGINES



PROTECTING YOUR INVESTMENT

There's no doubt about it, small capacity engines are the way of the future, and experts agree, that with the right care and maintenance these engines will last as long as any larger-capacity mechanical diesel. They are predicting, however, that parts like your turbo and fuel injectors should be considered 'serviceable items', much like your clutch or timing belt, and it should be expected to repair or replace these parts at given intervals for the overall good of your engine.

When it comes to power up modifications, go with a reputable brand and tuner, and err on the side of caution when it comes to extracting more power if you want it to last well in to the future. Routine servicing every 5,000km using quality parts and the use of clean fuel from a reputable supplier will extend the life of any common-rail engine. Water separators offer additional protection and should be considered, too, but it pays to consult a diesel expert when selecting the correct filtration for your vehicle, as some of these fuel systems can be quite temperamental to restrictions in the fuel line.

HOW TO MAKE YOUR CRD GO THE DISTANCE

- Carry out routine engine oil and filter changes every 5,000km.
- Replace the fuel filter every 15,000km.
- Install an OBD-II engine monitor to keep tabs on the health of your engine.
- Have your CRD inspected by a reputable diesel specialist once a year.
- When choosing a power-up mod, only use proven brands and have them installed and tuned by an experienced diesel workshop.

Like anything, if you look after it, it'll look after you.

SAFETY FIRST!

A trick used on older diesels is cracking the pressure through the injector line to get rid of any air locks. Thanks to the extreme pressure build up in the rail and injector in a CRD engine, this is fraught with danger on modern engines. Before commencing any work, fuel pressure should be relieved through the dedicated bleed off system. Failure to do this may result in serious injury.

HOW TO PREVENT YOUR COMMON-RAIL FROM FAILING

STEPHEN COUGHLAN - TOYOTA AUSTRALIA

"Regardless of the brand, common-rail diesel engines utilise precise technology and require diligent maintenance (in-line with the timeframe and mileage stipulated by the manufacturer) as well as good quality diesel fuel to ensure optimal performance and longevity."



CONTACT

BAILEYS DIESEL GROUP

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DENCO DIESEL

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MTQ ENGINE SYSTEMS

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ADVENTURE IN THE FLINDERS

With stunning views and country as old as time itself, the iconic Flinders Ranges is a must for any 4WDer

WORDS AND PHOTOGRAPHY BY DAVID LESLIE



For many 4WD enthusiasts the lure of a long weekend has our minds frantic with where we can go, and what tracks we can do. For months in advance we'll be busy getting the vehicle ready, frantically finishing the latest modification, filling gas bottles and putting the gear list together. The perfect long weekend destination has to give you that sense of being remote, but is still only a day's drive away. You have to have a campsite all to yourself and of course there has to be plenty of 4WDing on offer. If you live in SA, then the Flinders Ranges could well be the perfect long weekend destination, and if you live interstate then

make sure you put the Flinders on your list of must see destinations in Australia. If you're planning on heading to the Flinders, then you might be wondering where the best spot to stay is, and after our last trip to the region we'd have to say that Rawnsley Park would just about tick everyone's boxes of what to look for in a base camp.

Located to the south of Wilpena Pound, you won't miss the left hand turn off to Rawnsley Park Station as you head along the main road from Hawker towards Wilpena Pound. It's about a six hour drive from Adelaide, and if you get up nice and early you should be making camp just after lunch giving you enough time to get

a crackling fire going and prepare some hot coals for cooking that night.

Rawnsley Park is well set out offering facilities for everyone, from resort style cabins to acres of scrub for the self sufficient camper. There are powered sites in the main camp ground but if you want that sense of remote camping, head out onto the property to find your own spot wherever you like.

If you like a few creature comforts there's a fully stocked shop with camping gear, food, frozen meat and even a bottle shop incase you run low! The shop is also chockers full of information and this is where you sign in and get all the maps you need for exploring the surrounding



WHERE:

Rawnsley Park is located approx. 30mins drive north of Hawker along the main road heading into the Flinders Ranges. The park occupies the land on the southern walls of Wilpena Pound

MAPS AND GUIDES:

Maps and Guides can be obtained from Rawnsley Park caravan park or Wilpena Pound information centre. Any good map book featuring the Flinders Ranges will give detailed information about the area. GPS units generally provide great coverage of the area.

INFORMATION:

The Flinders Ranges features some of the oldest geographical sites in the world. This area is abundant in flora and fauna and with breathtaking views upon every rise it is a 4WD and bushwalkers dream.

CAMPSITES:

Rawnsley Park offers both Powered and Unpowered camping sites, even when camping unpowered you can utilise all facilities on offer within the park

FUEL & SUPPLIES:

You can find everything you need at the Rawnsley Park caravan park office including food, fuel and drinks. There are larger facilities including mechanical in the township of Hawker just 30mins drive south or Port Augusta is two hours to the west.

BUDGET ATTRACTIONS:

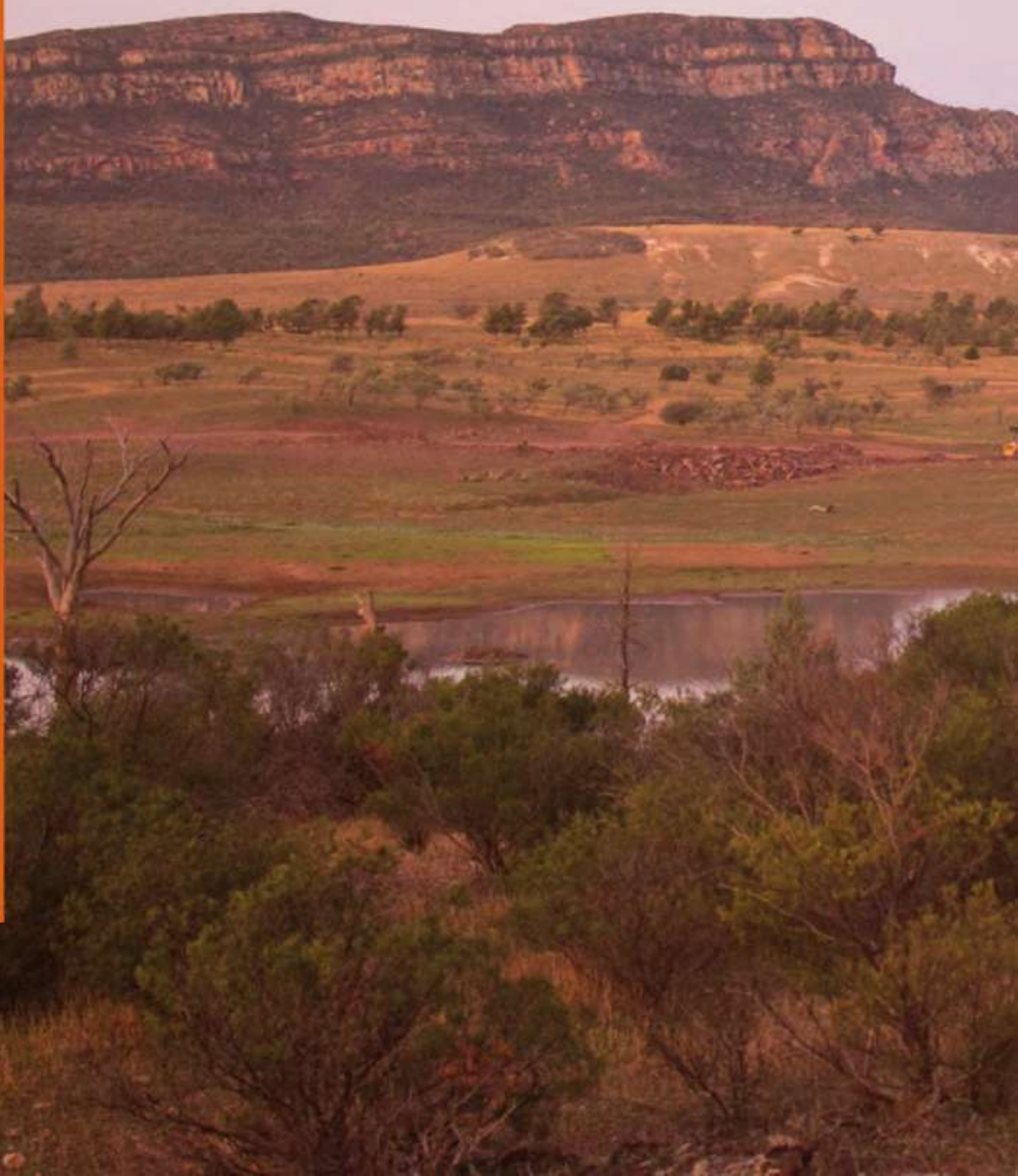
Once in the Flinders, you won't need to spend much money to explore the area. Bushwalking and 4WDing and bike riding are the main activities for the Flinders as well as looking for animals, photography and campfire cooking.

WHAT TO TAKE:

You won't need much more than your typical camping gear for most of the Flinders, though some parts can be very remote so pack accordingly. Basic recovery gear is needed of your planning to lock in the hubs and take plenty of drinking water.



Enjoying some tunes around the fire whilst the aromas of a lamb roast fill the air



The view of the southern walls of Wilpena Pound is stunning at sunset



areas. There are toilet and shower blocks available for all campers and even a swimming pool! No bookings are required at Rawnsley Park for unpowered camping, not even at Easter! That's how much space they have on offer so you can roll up and stay for as long as you like.

One of the main activities in the Flinders is bushwalking and there are plenty of bushwalks leaving from Rawnsley Park to suit everyone's abilities. With some of the most spectacular scenery you're likely to see anywhere in the country, make sure you pack the camera as this place is a photographers dream. The Flinders is teeming with wildlife and there is a stunning back drop on every rise to fill even the widest camera lens.

After setting up your camp amongst the native pines, you will find it hard to

drag yourself away and explore the rolling hills but if 4WD adventure is what you're after, you've come to the right place! There are many 4WD tracks across the Flinders Ranges and many can be found on private property. Many of the stations up this way have opened up their gates for tourism, just like Rawnsley Park, and so you will find the choices are plentiful of 4WD tracks that the greenies can't get their hands on and throw a padlock on the gate.

Rawnsley Park has its own track called the Arkapena Scenic 4WD Track. There is a small cost to tackle this track and a deposit for the gate key, all of which is organised through the park office. The track is divided into two sections, the first of which can be tackled by most all-wheel drive vehicles that may not have low range capabilities. The second part of the track will require a bit of

extra ground clearance and low range is a must to climb some of the steep and rocky tracks. If you choose to do both tracks make sure you allow the whole day to do it and pack your lunch to take advantage of the many stunning picnic areas you will find along the way.

The all-wheel drive track will take you through some beautiful scenery providing amazing views of Wilpena Pound in your rear vision mirror before taking you north along the base of the Chace Range. The track weaves its way along the foot hills, in and out of creeks and whilst the track is not incredibly difficult there are a few spots you will need to concentrate on, especially if you are in an all-wheel drive vehicle.

The track then crosses a main dirt road and heads in to low-range country. There is an excellent spot to stop for lunch in

THE ONLY THING BETTER THAN CLIMBING THROUGH THE RANGES IS THE VIEWS AT THE TOP OF EACH CREST

a large dry creek bed before you lock in the hubs and head up towards the heavens. This part of the track will have you bouncing around over the rocky and slippery terrain as you climb higher and higher. First gear low will get a work out and the only thing better than climbing through the ranges is the views at the top of each crest. There are several opportunities to take some photos from the lookouts along the way before crawling back down and making it back to camp just in time to set a roast going on the fire, and settling in with a cold beverage in one hand and some fine cheese in the other.

If you can't be bothered to cook your own meal then make sure you book in to the Wool Shed Restaurant just a few hundred metres from camp along the main drive way of Rawnsley Park. We were lucky enough to be a part of the Easter Sunday feast which consisted of a delicious lamb on the spit and enough roast veggies to feed a small army! The Wool Shed provides a wonderful atmosphere and you will find yourself laughing and dining with people you've never met turning strangers into new friends. There's plenty of cold drinks and the desserts are amazing so you can enjoy a wonderful night with your family

BEST TIME TO TRAVEL:

Winter and spring are the best times of the year to explore the Flinders.

THINGS TO DO:

Bushwalking is one of the best activities to enjoy in the Flinders along with 4WD and bike riding. There are endless photo opportunities and you won't want to waste the hot coals without cooking a roast or damper. Scenic flights are available from Wilpena Pound as well as guided 4WD tours of the area.

TRIP STANDARD:

This trip is rated E but you can make it as hard or easy as you like depending on how much and where you want to go within the Flinders Ranges.

RESTRICTIONS AND PERMITS:

Permits are required to explore the Flinders Ranges and all camping sites weather on private property or within the national park require fees

CONTACTS:

Rawnsley Park
PH: (08) 8648 0008
W: www.rawnsleypark.com.au

Wilpena Pound
PH: (08) 8648 0048
W: www.wilpenapound.com.au

Hawker
PH: (08) 8648 4022
W: www.hawkersa.com.au

Enjoying the sun on a cold outback morning



THE FLINDERS RANGES COULD WELL BE THE PERFECT LONG WEEKEND DESTINATION



The Flinders really is a
photographer's paradise

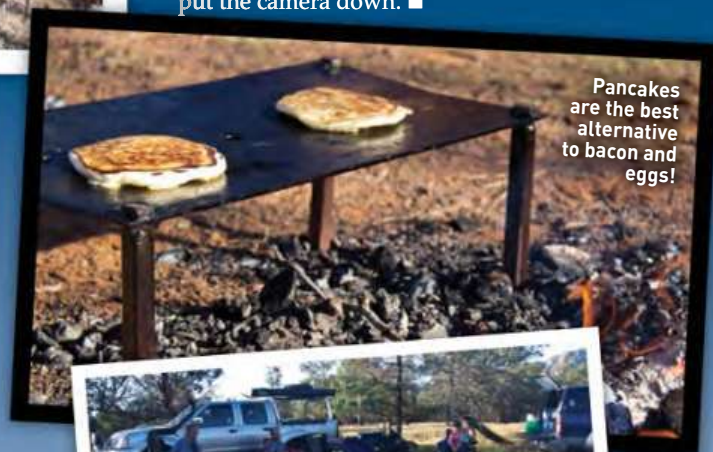


Some creek crossings are a little steeper than they look!

before heading back to your million star accommodation for the night.

If you don't have much time to explore the Flinders Ranges, then Rawnsley Park is your one stop shop. You can experience the best of the Flinders in just a long weekend all in the one spot. If you're lucky enough to have a few weeks up your sleeve to do a bit more exploring make sure Rawnsley Park is on your itinerary. Enjoy a meal at the Wool Shed Restaurant and tackle the Arkapena 4WD track along with the many bushwalks on the property, and make sure the camera batteries are fully charged and you have plenty of memory cards because we guarantee you won't put the camera down. ■

MAKE SURE YOU PACK THE CAMERA AS THIS PLACE IS A PHOTOGRAPHERS DREAM



Pancakes are the best alternative to bacon and eggs!



Getting the fire ready for some campfire cooking



The walls of Wilpena Pound make a stunning backdrop as you explore the Flinders

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WHAT A SPORT

Would you be willing to take a \$130K 4WD off-road? We did just that with a brand new Range Rover Sport!

WORDS AND PHOTOGRAPHY BY TRAVIS ANNABEL

NEW VEHICLE MY15 RANGE ROVER SPORT

Being the editor of a 4WD magazine has a tonne of advantages, and regularly getting the opportunity to drive a multitude of brand new 4WDs is high amongst them. Until recently, the most expensive 4WD I'd had the opportunity to drive off-road had been a top-spec Y62 Patrol, which comes in at a tad under \$115K. I surpassed that figure not long ago when I was given the opportunity to take a brand spanking new SDV6 SE Range Rover Sport away on a trip to Georges

Junction, which is a sensational spot in the New England region of NSW (don't miss my full travel article next issue). The SDV6 SE model that I took on this trip comes in at just under \$130K (drive-away, with a few optional extras), and knowing the sheer price of it, I began wondering – if I had spent my own money on this 4WD, would I be driving over the kind of terrain that I did at Georges Junction?

The answer is no – but probably not for the reason you're thinking. Read on to find out why!



The Range Rover Sport exhibits the same off-road capability that the Land Rover Brand have developed a reputation for



Our fuel figures of 11.8L/100km were highly impressive considering the fact that we were towing for the entire trip



COMFORT AND PRACTICALITY

Taking the Range Rover Sport on such a big trip meant a lot of hours inside the vehicle, and also meant that the whole family was along for the ride, as well as a camper trailer in tow.

For \$130K, you'd expect the Sport to be comfortable, and it definitely is. But is it \$130K's worth of comfortable? That's the question. Considering what you get in a couple of alternative 4WDs in the same market, namely the Discovery SE SDV6 (featuring the exact same engine) and the Grand Cherokee Overland Diesel and the answer is no. The SE SDV6 comes in at around the \$85K mark, and features the majority of safety and comfort features that the Sport comes with. The multimedia head unit is the same, the majority of comfort

and safety features are the same – about the only major features we could find that were featured only on the Sport was a Heads Up Display (which displays speed, gearing and navigation) and a "Panoramic Roof" which is essentially a full-length sun-roof, without the ability to open to air. But you pay over \$40K less for the Discovery. Taking it even further, the Grand Cherokee Overland Diesel actually has more features than the SE Sport. While it didn't have the HUD, it did have adaptive cruise control, lane assist and a few other things that made it feel like a true luxury vehicle, even more so than the Sport. And the Grand Cherokee Overland Diesel comes in at well over \$50K less than the Sport at \$72K. Additionally, the Sport SE felt less intuitive than either the Grand Cherokee or the Discovery when we first got behind the wheel. Little things

like the seatbelt being hard to access due to the arm-rests and the fact that the parking sensors only work once you engage reverse unless you turn them on manually every time are little first-world problems that you'd quickly get used to when you owned one – but for \$130K you shouldn't have to "get used to them".

The Sport's not without its pro's however. The HUD was truly excellent, and meant you rarely had to take your eyes off the road. The ride, cabin comfort and complete lack of outside noise were fantastic. The 3.0L twin-turbo diesel had an absolute plethora of power, and remained economical even when towing. In fact, it was incredibly easy to forget that the trailer was even there. But – you'd expect all of that when you're spending \$130K on a new 4WD.

The Four Corner air suspension provided a comfortable ride on and off the road

**IF I HAD SPENT MY
OWN MONEY ON
THIS 4WD, WOULD
I BE DRIVING IT
OFF-ROAD?**

PERFORMANCE AND CAPABILITY

Performance wise, the Range Rover Sport SE SDV6 shines. The punchy 3.0L twin-turbo diesel outputs 215kW of power and 600Nm of torque, and you can feel every bit of that as you're pushed back into the seat when you accelerate. Driving in Dynamic mode gives you even more response – the Sport really does drive like a car on the road, and a sporty one at that. The 8-speed auto is smooth, and the Four Corner Electronic Air Suspension

makes the ride both on and off-road a treat.

Economy wise, over the course of our trip, the Sport averaged an impressive 11.8L/100km. Considering the fact we did a fair bit of low-range driving, not to mention the fact that we were towing a camper trailer for the majority of the trip, that really is a spectacular figure when you have the kind of power and torque on tap that the SDV6 offers.

Talking about low-range, the Sport certainly delivers on what is the Land Rover brand's signature off-road capability. The traction control was superb, and the Terrain Response off-

road system faultless. This is where the Range Rover Sport shines over the Grand Cherokee – it is, simply put a far more capable vehicle off-road than the Jeep. I'm not afraid to cop a bit of flak for saying that from the Jeep die-hards, either. I challenge them to drive both vehicles off-road and tell me that the Grand Cherokee is better and maintain a straight face.

What about when compared to the Discovery, though? Simply put, my feeling is that the Discovery surpasses the Range Rover Sport in the off-road stakes, but it's honestly like splitting hairs, because they really are both very capable 4WDs.

THE FUEL ECONOMY IS SPECTACULAR WHEN YOU HAVE THIS KIND OF POWER AND TORQUE ON TAP



SPEC RUNDOWN

MODEL	Range Rover Sport SE SDV6
ENGINE	3.0L intercooled twin-turbo diesel
POWER & TORQUE	215kW and 600Nm
GEARBOX	8-speed auto
4WD ACTIVATION	Terrain Response with low-range gearing
FUEL CAPACITY	80L
OUR AVG FUEL FIGURES:	11.8L/100km (While towing, including low-range driving)
BRAKED TOWING	3,500kg

OUR VERDICT

Quite simply, by the time we'd handed the keys of the Range Rover Sport SE SDV6 back to Land Rover, I was unconvinced at the Range Rover Sport's value for money. Comfortable? Yes. Luxurious? Yes. Fuel efficient? Yes. Powerful? Yes. Capable off-road? Yes.

But is it all of those things to the tune of \$130k? That's the question that any potential owner needs to ask themselves. And consider this too – out of the entire Range Rover fleet (bar the Evoque), the model we tested was the third least expensive. It's true, that the Range Rover badge in and of itself carries a certain value, and many people are willing to pay a premium simply because the steering wheel says "Range Rover" on it. But personally, I've never been one for designer labels.





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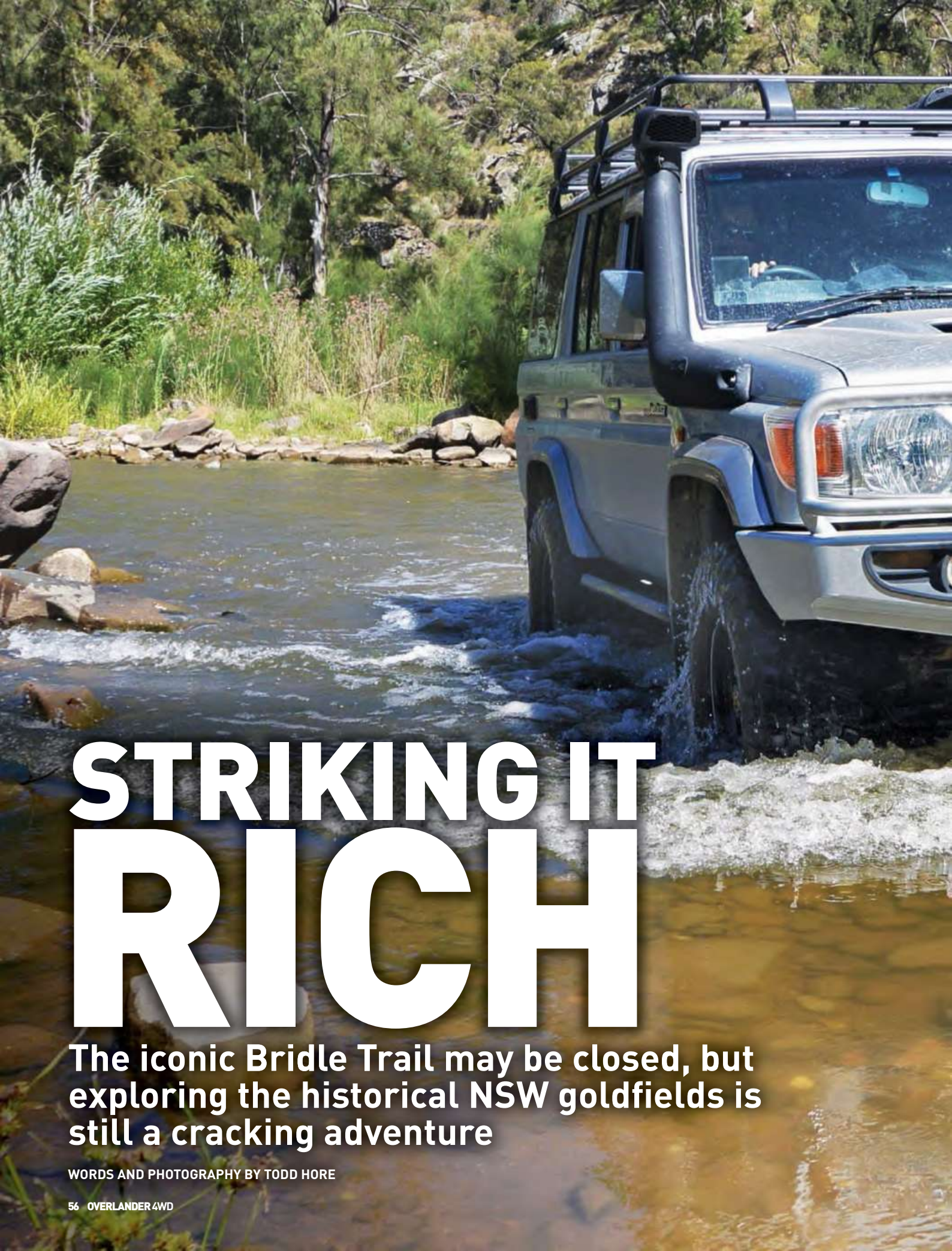
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A silver 4WD vehicle is driving through a river, splashing water. The background is a lush green forest with tall trees and rocks along the riverbank.

STRIKING IT RICH

The iconic Bridle Trail may be closed, but exploring the historical NSW goldfields is still a cracking adventure

WORDS AND PHOTOGRAPHY BY TODD HORE



By now most people and especially 4WDers and tourers would be aware that one of the great touring and camping tracks in NSW is closed. The Bridle Trail that stretched between Bathurst and Hill End was closed in 2010 following a rock fall that both blocked and caused a collapse of part of the track at Monaghan's Bluff. The cost of repair work means that this track will likely never be re-opened. All is not lost, however, as you can still camp all the way along the track and if you're willing to get creative you can even head all the way to Hill End.

Just north of Bathurst lies Fremantle Road, the alternative gateway to the Macquarie River and Hill End. Root Hog Fire Trail lies at the northern end

of Fremantle Road and provides access along the dirt to the Macquarie River, the Bridle Trail and the countless riverside camping areas. Root Hog passes through private property so be sure to leave gates as found and do not deviate off the track. The track can get rocky and rough in places but it is by no stretch a difficult descent down to the river.

At the bottom of Root Hog you are greeted with grassy riverside camps and swimming holes in every direction. It doesn't really matter which way you turn as left or right once you reach the river will reveal picture perfect camp sites right on the river. Swimming holes are a plenty and the Macquarie River is also a well-known trout fishery so don't forget to pack the rods. You could easily spend a week or more just enjoying everything the

river and surrounds have to offer. That was not the aim of this trip, however. We were here to restore the Bridle Trail to its once iconic touring status.

Whilst simply awesome, the stunning camps and river are not even the best part. There is a curved crossing over the Macquarie River here that links up with the Bridle Trail. That's right, access to Hill End via the Bridle Trail remains and if anything has become more interesting. The crossing is marked by large boulders, and in normal conditions is fairly shallow. It's still worth checking the water depth and having a look for boulders that might grab a diff housing on the way through – you'll probably only get wet knees but better safe than sorry. The exit out of the crossing is a little steep and rutted in parts but should present few issues.

Once onto the Bridle Trail and heading north (south would take you to the blocked/collapsed track) there is access to countless marked and managed campsites like Mary Flynn Reserve and Cave Hole Reserve. If you're a little more adventurous, there's also hundreds of smaller unmarked areas along the river. Speaking of rivers, this is also where the Macquarie River joins the Turon River, that other well-known trout fishery in the region. A walk along the river quickly reveals countless deep holes that no doubt hold fish.

There is evidence of mining activities along the entire length of the Bridle Trail, however the most obvious and easily accessible in this northern section are probably just beyond the concrete causeway crossing over the Turon River. A track extends up the hill and no more than 200m from the Bridle Trail you will find an old battery stamper standing proudly at the tree line. Walk (or drive if your 4WD is capable) up the steep hill behind the stamper to find old mine

shafts and further remnants of the mining activities that dominated this region in the mid 1800's.

Further on towards Hill End the track narrows and becomes steeper in places, but should present little trouble to a well set up vehicle even in wet weather. Care should be taken when approaching blind corners as a bump or swerve here could have disastrous results. Upon reaching Hill End you will find tar roads. Don't be too disappointed though as the tar is only in the central part of town and it also signals your arrival to an amazingly preserved gold mining town. Our first port of call was Kissing Point Lookout to the south of town. Along the track to the lookout there are mines that actually remain active today. Looking south-east from here you can see parts of the Bridle Trail that you would have driven hours earlier off in the distance. About 50m down the hillside is Split Rock. This rock formation includes a huge boulder that looks as though it has been struck with the axe of a 100m tall man and split

perfectly through. You can walk down to the rock and even feel how smooth the split is.

Once it's lunch time, where better for a feed than the local watering hole. The Royal Hotel in Hill End was built in 1872 right smack bang in the middle of the gold rush era and is the only pub out of a massive 28 original pubs that remains operational today. The pub still has that old world charm of a great country pub and they back that up with cold beer and a sensational pub meal. A little outside courtyard is located around the back and opens up to a massive beer garden where you will be fighting the resident bird life for the scraps of your meal.

You could easily spend an entire weekend exploring town and just soaking up the history. The Village campground, located central to town, would allow you to easily do just that for \$10 per person per night for a powered site or \$7 for unpowered. Our whirlwind tour didn't include time for that so our next move took us to Beafey Merlin Lookout. The

YOU COULD EASILY SPEND AN ENTIRE WEEKEND EXPLORING HILL END AND SOAKING UP THE HISTORY



WHERE:

Hill End is located 75km north-west of Bathurst, or roughly 300km west of Sydney.

CAMPING:

There are a tonne of riverside campsites along the banks of the Macquarie and Turon Rivers. Some attract fees, however those with a keen sense of exploration can find cracking spots with no charge.

TRIP STANDARD:

This trip would be rated a D to E, as it's relatively easy. This would change in the event of recent rainfall, as there are some long river crossings that are quite deep after wet weather. There are optional side tracks that would rate higher, around B or C.

WHAT TO TAKE:

Most of the Riverside camping in the area will require you to be self-sufficient, however the campsites near Hill End are so close to town that you can get just about everything you need there.

BEST TIME TO TRAVEL:

The warmer months will see you making the most of the rivers and their surrounds.

RESTRICTIONS AND PERMITS:

There are numerous campsites that require small fees – some will have honesty boxes, while others will see a ranger or volunteer collecting the fees.

CONTACTS:

Royal Hotel, Hill End
PH: (02) 6337 8261

Hill End Historical Site (NPWS)
PH: (02) 6337 8206
W: www.nationalparks.nsw.gov.au



A WEEKEND OUT THIS WAY IS JUST NOWHERE NEAR ENOUGH TIME TO EVEN SCRATCH THE SURFACE

Having a campsite this close to water in hot weather? Priceless!



There's no shortage of historical artefacts in this region that tell the story of the old mining days





lookout sits atop the gullies and mines located just outside Hill End and includes a timber bench positioned perfectly so you can sit overlooking the old mines and just relax. Not far from here is Bald Hill Mine where guided tours are conducted (usually daily) for less than \$10 per adult and is even cheaper for the kids.

Back in town, the old Great Western Store has been converted to a mini museum of sorts. For a small donation you can see some old relics of the gold rush era including a mining cart and an old clothes wringer. There is also some pews set up at the rear where you can sit back and watch a looping movie of gold rush era photos from around Hill End. This really is a fantastic place to start your exploration of Hill End. Take note of some of the places shown in the movie and then compare them to the current day features. It's simply mind blowing how different some things are and how little others have changed.

Not far north of town is an area known as Golden Gully. The former alluvial

gold mining area has been eroded over the years. The erosion has created a spectacular natural arch and has exposed several former mines throughout the area. Some of the mines are so well exposed that it's an easy walk through them. Be careful through here though as the uneven ground and low light can make navigation slightly difficult. As we discovered there's no sun inside a mine, something you don't naturally think about when it's 30 degrees outside and the sun is blaring down!

Further north is Valentine's Mine. It's a 500m drive off the Ullamulla Road but is well signposted. This mine is so amazing because almost the entire process can be imagined from here. The original timber winch mount stands above the mine complete with chain and bucket hanging into the mine, although the winch has been removed. The battery stamper and water tank remain intact around 50m away. You can really imagine the miners pulling up their diggings and carting them 50m over to the water tank

and stamper where the quartz would be crushed to reveal the valuable gold within. Those blokes back then sure worked hard for their money!

Further west a turn down Alpha Road will take you to the Cornish Roasting Pits and the ruins of the Battery Plant Complex. The roasting pits are in remarkable condition for a structure constructed in 1855. Again you can almost see the process unfold before you - the quartz would have been roasted to help break it up then transferred to the battery complex where it was crushed. The theory was that the roasting process would weaken the quartz and help separate other minerals such as the precious gold.

Winding your way further along Ullamulla Road though farmland, up and down hills and over cattle grids you'll eventually reach Dixons Long Point and the Macquarie River again. The crossing here is very long at around 70m when the water is low and can be even longer when the river is up. When the water does rise, this crossing can easily become

impassable simply due to its length. If something goes wrong in the middle a recovery from deep water would be the stuff of nightmares. As a rule of thumb if you can't see the rocks on the downstream side of the crossing it will be too deep to cross. For our trip it was a pleasant half to three quarter wheel depth.

Climbing back above the river on Long Point Road you can't help but be blown away by the landscape. A winding ribbon of dirt twists and turns through some of the most glorious farmland you could ever hope to see. That big trail of dust behind each vehicle just looks like freedom and the fresh air smells like it.

Your target is Ophir Goldfields Reserve. This was the site of Australia's first payable gold find in 1851 that sparked the gold rush in the surrounding regions. The area has been beautifully preserved and mines can be seen almost from the road. The campground is maintained by council with the assistance of volunteers from the Ophir Reserve Trust. There is a \$10 per vehicle camping fee and for that you get a toilet block with flushing toilets, rubbish disposal and freedom to roam and camp wherever you like. More than that, you get access to countless 4WD tracks and walking trails through an area that makes most 4WD

parks seems like a suburban block.

The reserve is located at the junction of Summer Hill and Lewis Ponds Creeks and includes a huge waterhole complete with rope swing and fish jumping on dusk. Those with a 4WD will benefit from access to some of the camps further off the road and away from the masses. It's hard to beat swimming and fishing 5m from your swag. A volunteer came around the next morning to collect fees - they do this on weekends only, as the rest of the time there's an honesty box near the toilet block.

The best option to take in the history of the area is to do the 2km walk that departs directly from the main campground known creatively as 'Walking Trail No. 1'. Before you've even walked 50m you will come across mines cut into the rocky hillside. These mines are large enough to enter and the bigger of the two extends hundreds of metres into the hill. Again it's an excellent idea to take a torch. Further along you will find evidence of alluvial gold mining with water races cut into the hillside.

Over the other side of the ridge the mining is completely different with open sluices cut into the hillside. The biggest of these is the Belmore Hill mine which not only includes a huge open sluice but

also several small tunnels and offshoots from the main sluice. These mines are cut into rock and are considered fairly safe to explore. Be aware this is not always the case and some mines are signposted as do not enter.

Whilst the off-roading through this region can either be as tame or as wild as you dare, it's really the 150 years of mining history to soak up that makes it a must visit. If that's not enough the picturesque camps and stunning swimming holes should ensure there is something here for everyone. A weekend out this way is just nowhere near enough time to even scratch the surface but it's a sensational start and will definitely have all in attendance talking about their next trip back. I know it's all we talked about the entire trip home! ■



There are numerous river crossings, that while they're easy in dry weather could cause dramas after a bit of rain

THE STUNNING CAMPS AND RIVER ARE NOT EVEN THE BEST PART



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ARISING STORM

Built to take Craig and his wife Kristy around Australia, this 76 is built ready to go!

WORDS AND PHOTOGRAPHY BY WES WHITWORTH



Selling up, packing the truck and taking off for a two year lap around Oz is probably the ultimate dream for a lot of us. We caught up with Craig Darken up in Townsville recently and he is getting set up to do exactly that.

After selling up his successful mechanical engineering firm in Townsville, Craig found himself a second hand 76 Series 'Cruiser with just 95,000Km on the clock. With the angry 1VD-FTV under the bonnet, he set about building it up to what it is today in just under 6 months, bashing it out every other weekend in the shed.

"Doing the lap around Australia and living out of a Kimberly Kamper we needed something tough, reliable, and with a heap of grunt to tow the camper. So when we found the 76, with the right amount of kays on it, we jumped at it," says Craig.

Getting a truck set up for the trip of a life time, Craig wanted something that was tough, and that had been tried and tested. So he chose the 70 Series platform that has been around for over 30 years. He and his wife Kristy picked the 76 series specifically for the slightly

shorter wheel base, which makes tighter tracks just that much easier to navigate. All that was left to do was add the tough touring mods to be able to support him and Kristy around Australia, through the deepest valleys, broadest deserts and longest beaches.

ARB Townsville looked after the original install of ARB accessories, getting the heavy duty mods done in their workshop. Craig tells us this consisted of front and rear Air Lockers, to give on-demand traction, front ARB bullbar, Rock Sliders Australia sliders, Kaymar rear bar, and Old Man Emu suspension amongst other things. "I chose ARB to supply and install the bar work, lockers, and suspension simply for peace of mind. Everything they supplied and fitted is warranted by ARB and if there are any issues I can drive into any ARB in Australia and have it sorted out while doing the trip," he tells us.

Following up on the bar work, Craig has installed an Ironman Monster 12,000lb winch into the front bar, a set of Fyrlyt 200 spotties and a 50in single row LED light bar up on the roof rack. Up on the ARB

roof cage, he's got a Hi-Lift jack and shovel holder and an ARB Awning off the other side.

When it was getting the works thrown at it at ARB Townsville, Craig had a set of 16x8 CSA Raptor wheels wrapped in BF Goodrich KM2's in 285x75x16 flavour fitted. Holding these firmly to earth Craig decided on a set of 50mm Old Man Emu springs and the Dakar OME Shocks in the front, and the rear a set of OME 60mm springs and Dakar shocks. "I put the slightly longer springs in the rear to allow for the extra weight in the back and for towing the camper," he says.

Managing the electrical side of things Craig has the Redarc BC-DC 1225 system mounted just in behind the radiator grille, controlling the power flow between batteries, with an Amaron 670CCA battery looking after starting and winching duties, and an intimidator 100Ah AGM battery running everything else. "The 100Ah AGM gives plenty of power for the interior accessories, and to run the fridge in the back," he says.



WHEN IT COMES TO TOUGHNESS AND REPLIABILITY, NOTHING BEATS A 70 SERIES

The 1VD V8 Turbo Diesel is a well-regarded engine, and offers plenty of power and torque to tow a camper trailer



With a fully kitted out storage section in the rear, the Stormtrooper is ready for any big trip

The ARB roof rack is home to a Hi-Lift jack, awning and lightbar



Inside the 'Cruiser, Craig's got Redarc EGT/Boost combo gauge and dual voltage gauges set up on the A-pillar which he fitted up himself. He's also got a roof console housing his UHF. He tells us he removed the small Toyota centre console and made his own to mount the small Waeco cooler to for keeping the drinks chilled. "I didn't like the factory console in the middle, so I've removed that and made my own with a flip up lid. This gives me storage under the fridge and a rock solid base to mount the cooler on. I also got a TPMS tyre pressure reader when I bought with the camper so I can monitor all 6 tyres on the 76 and on the trailer from inside the cab."

There's also a PureAndroid head unit he found online running into a set of Pioneer 6x9in speakers in the

rear cargo area and 4in in the dash. "I got the PureAndroid head unit as it runs the Android operating system, so if I don't bring my Samsung Tablet, I've still got Ozi-explorer and Hema maps on the head unit with built in GPS, and also I can run the scan tool via Bluetooth directly to the head unit," Craig explains. Completing the front setup Craig has a GME TX3520S UHF coupled with the GME AE4705B aerial which covers him for the communications he needs.

In the back of the 76, Craig has a set of Outback Drawers, cargo barrier and shelving to keep things tidy. Next to the shelving he's got the Waeco CFX30 which gets used mainly as a freezer due to having another fridge in the camper. Under the rear he's upgraded the main fuel tank to a

Long Ranger 166L in steel. "I've got plenty of water on the camper but I'm looking to add a small water tank in the future to the 76 so we've always got water with us if we go for day trips away from the camper," he says. He's also got a Baintech DC distro panel in the wings, a reversing camera mounted on the rear brake light up top and a fold down table on the barn door.

Considering the trip and time frames that Craig is looking at for his lap, this 76 Series LandCruiser is set up cleanly, efficiently and customised to perfectly compliment the trip. "The 70 Series was what we were looking for, for reliability and toughness, and the 76 is perfect for what we wanted." Don't think we could agree more for a tried and tested tourer Craig. ■

TECH SPECS

VEHICLE	2010 76 Series LandCruiser
ENGINE	8 Cylinder 1VD-FTV Turbo Diesel
GEARBOX	Toyota 5 speed manual
4WD ACTIVATION	Auto locking hubs
FRONT SUSPENSION	Old Man Emu 2in lift coil springs
REAR SUSPENSION	Old Man Emu 2 1/2in leaf springs
TYRES	285/77R16 BF Goodrich KM2
WHEELS	16in CSA Raptor
OTHER GOOD GEAR:	ARB winch bar, sliders, FyrLyt spotties, Ironman Monster winch, Long Ranger fuel tank, Roof Console, Rollbar, ARB Awning, Waeco Fridge, Outback Drawer system, Kaymar rear bar, ARB Air Lockers front and rear, GME UHF.



The Kaymar rear bar holds dual spares, a necessity for any long-distance tourer

“I PUT THE SLIGHTLY LONGER SPRINGS IN THE REAR TO ALLOW FOR THE EXTRA WEIGHT”



Craig built his own centre console to accommodate an in-cab fridge



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GOING THE DISTANCE

Looking to increase your touring range?
Here's 15 ways to go further for longer

WORDS BY TRAVIS ANNABEL, PHOTOS BY OVERLANDER 4WD



This big island we live on features without a doubt some of the most wild and remote locations on the planet. For many of us, the remoteness of Australia is the reason we own 4WDs – so we can get to those spots where 99% of people have never been, and will never go.

The very nature of remote adventure touring means that there'll often be hundreds of kilometres between servos, and you'll often encounter a situation where a track is closed due to poor weather conditions, meaning you need to backtrack for 100s of kilometres. When it comes to touring, let's face it – getting out there is one thing, but getting back is priority number one.

So what can you do to go further? In this article, we take a look at 15 ways to increase your touring range. From fuel additives to load carrying and engine upgrades, we've left no stone unturned in the hunt for greater touring range!

GETTING OUT THERE IS ONE THING, BUT GETTING BACK IS PRIORITY NUMBER ONE

1 JERRY CANS

The first tried and tested option is to carry jerry cans. Jerry cans are an affordable option to increase your fuel capacity for those longer legs on your trips, but they also mean that you need to make space to carry them.

Weight distribution is a big factor when it comes to carrying jerry cans. 20L of diesel weighs 17.5kg, and 20L of petrol weighs 14.6kg. When you consider that most 4WDs have a maximum roof load limit of around the 100kg mark, then a 45kg roof rack and three 20L jerry cans pretty much have you at the limit of what you can carry.

One benefit of carrying jerry cans is that you always have back up, so even if your long range or sub tank cops a leak you won't lose all your fuel.



TOP JERRY CAN TIP

Any container you carry fuel in needs to be compliant and marked with the AS/NZS 2906:2001 standard for portable plastic and metal fuel containers. Make sure you carry spare seals and lids with you in case you damage or lose one.

2 DRIVING FOR ECONOMY

The simple fact is that driving technique plays a big part of touring range. One way to look at it is when it comes to fuel efficient driving off-road, you need to drive like there's a rusty nail sticking through the accelerator pedal. Anything other than gentle and smooth, and the nail will stick into your foot and cause you a world of pain. The only difference between the analogy and the reality is that the pain will hit your hip-pocket, not your foot!



4 4WD MODIFICATIONS

A modified 4WD with huge tyres, big lift and half a tonne of bar work might be highly capable on those tough tracks close to home, but for outback touring they're completely impractical. A story from our mate Dave Cox from the Mount Dare Hotel says it all.

"I once saw a 200 Series 'Cruiser come through the roadhouse with 35in tyres, a 6in lift and a heap of gear on the roof," Dave says. "The driver was complaining about the amount of fuel he was chewing through. After having a chat with him about ways to improve his economy, I saw him come through again after a year or so. His 200 had been dropped back to a 2in lift and was running 33s, and he was pleased to tell me that his off-road economy had improved by 5L/100km."



3 LONG RANGE TANKS

If you're looking for a permanent solution then having a long-range fuel tank installed is the best option. While it may be more of an expensive investment initially, it's far safer and more convenient than using jerry cans. It also allows you in most cases to greatly increase the amount of fuel you can carry.

There are a few options when it comes to installing a long-range tank. If your 4WD doesn't already have one, then supplementing your main tank with a sub or auxiliary tank is the common choice. Replacing either your factory main or sub tank with a larger unit will boost your touring range considerably, and eliminate the need to carry jerry cans.

LONG RANGE TANK TIP

If you have the space to install two smaller tanks rather than one big tank, then it gives you a bit of an insurance policy against losing all of your fuel should your tank get a puncture.

5 PREMIUM FUEL AND FUEL ADDITIVES

Premium diesel and high-octane petrol can provide improved fuel economy over regular fuels. While the increase is negligible over short distances, if you're looking at travelling 1000s of kays, then the additional range that premium fuels offer is quite noticeable. The only problem is availability in remote areas. In places like the Simmo and central WA, premium fuels are simply not readily available.

That's where octane boosters and diesel additives come into play. By carrying a bottle or two, you can add them to regular, low octane petrol to provide an octane increase to levels found in premium fuels, giving you similar benefits. There are also similar benefits to using diesel additives.



6 FUEL SAVING DEVICES

Utilising devices such as fuel magnets or a Hiclone can have a positive affect on your fuel economy. A fuel magnet is designed to realign the molecule in the fuel as it nears the injectors, which makes the fuel burn more efficiently. In a previous test we completed sometime ago, our results revealed that these magnets can improve fuel economy by as much as 0.57L/100kms.

Hiclones are stainless steel devices that fit into your vehicle's air intake system. They're designed to create a swirling effect with the intake's airflow, which claims to help with the combustion process.



7 PERFORMANCE CHIPS AND TUNES

Performance chips and reprogrammable ECUs are designed to change the factory tune of your 4WD's engine, in order to provide a combination of more power and better fuel efficiency. There are two types of chips on the market: pre-programmed chips with a "one size fits all" tune, or a reprogrammable chip.

Custom tuned performance chips cost a little more, but they offer the greatest increase in both power and economy. This is due to the fact that a custom tuned chip is tuned specifically to your vehicle's modifications and your driving style.



8 TYRE PRESSURES

When you're touring long distances in the outback, you encounter a large variety of different terrains and surfaces. It's no secret that running the correct tyre pressures will give you better off-road performance, but it'll also improve your fuel economy.

Simply put, running lower pressures off-road will allow you to drive rougher terrain with less effort, and means you'll take fewer attempts when you tackle soft dunes and other difficult sections. The reverse applies when you're back on the black-top, so make sure you're carrying both a tyre deflator and air compressor to adjust your pressures accordingly.



WHAT PRESSURE IS BEST?

For low-range tracks or soft sand, run your tyre pressures between 14-18psi. For high-speed touring, running pressures between 20-26psi is recommended. For blacktop driving, running between 32-36psi will give you a good combination of comfort and tyre life depending on your specific tyre size.

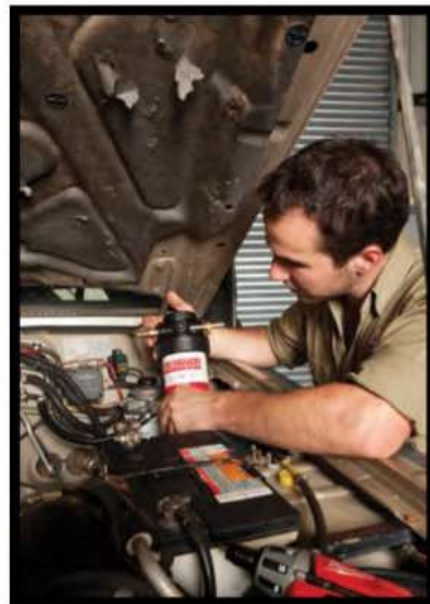
9 AERODYNAMICS

Aerodynamics and wind resistance play a big part in affecting fuel economy. Loading your roof-rack in a way that minimises drag will help lessen the load on your engine. Aerodynamically designed hard-shell roof top tents are a smart option. If you're touring in a ute without a canopy, then using a tonneau cover over the tray will also greatly reduce wind drag, and help improve economy.



10 DIESEL PRE-FILTERS

Who likes the taste of watered down light beer? Not us, that's for sure. It lacks punch and you need to drink more for it to be satisfying. It's the same when it comes to diesel fuel. First thing to keep in mind is fuel goes off, or loses its potency the older it gets, so filling up at a reputable servo with a high turn-over rate is your best bet. Poor quality fuel not only produces less power, but it also has the potential to increase the wear in your engine. While you might not feel the immediate effects of dirty fuel, over time it gradually weakens the fuel pump and injectors, making the engine less efficient. The best thing you can do to safe-guard your engine and maximise the performance is to regularly service your fuel filter. Swapping it out every 10,000km or after every big trip will keep things safe. It's also worth throwing on an additional pre-filter with a micron rating between 50-100, glass bowl and water alarm – they are worth their weight in gold. Do the maths, \$400 worth of fuel filters over 100,000km is a bucket-load cheaper than a new engine!



11 TOWING A TRAILER

Many of us choose to travel with a camper trailer because of the additional comfort and facilities they offer, especially for longer trips. But when it comes to touring range are they a help or a hindrance?

While towing a trailer places more load on your engine, which in turn will considerably increase fuel consumption, it also provides additional space to store fuel in a safe manner. Towing a trailer will generally increase your fuel consumption from anywhere between 1L/100km to 4L/100km, which is the downside. But the additional space can allow you to carry as many as four additional jerry cans, providing an extra 80L of fuel.

***DRIVE LIKE THERE'S A
RUSTY NAIL STICKING
THROUGH THE
ACCELERATOR PEDAL***



12 REGULAR SERVICING

Keeping on top of your 4WD's maintenance will have a pretty big impact on how much you save at the pump. The perfect example is the extra drag that a sticky brake caliper and over adjusted brakes cause. More drag means the engine needs to work harder, and will use more fuel. Make sure you clean out any mud from your drum brakes, and have your handbrake adjusted properly.

Before you leave on a trip, also make sure you check the injectors for clogging as well as ensuring the valve clearances are correct for maximum engine performance and economy.

Additionally, when you're on a trip make sure you regularly check and tap out your air filter, as this can be a common contributor to high fuel consumption.



13 CRUISE CONTROL

There are a few differing opinions on whether using cruise control improves fuel economy or not. After extensive testing, our results proved that over a distance of roughly 600km it would save just over a litre of fuel. While that may not seem like a huge improvement over a short distance, think about the savings you'd get on a longer trip. Over the course of a 6000km, once-a-year epic trip you'd save 12L of fuel by using cruise control the majority of the time. This translates to an extra 100km of driving distance, which is always welcome.



14 REDUCING WEIGHT

Dave Cox experienced first-hand how much difference there is between 4WD's with excessive loads. "I was recently out on a trip in the Simmo with a mate. We were both driving practically identical dual cab utes, and the only difference was what we were carrying," he says. "My mate was carrying pretty much nothing more than two swags, while my ute was packed full of tools, jerry cans, food and about half a tonne of other gear. Over the distance we travelled, I used an additional 20L of diesel compared to my mate." If you're driving in a convoy, make sure you try to evenly distribute the weight, and share the spares. Co-ordinate before you leave who brings what. Additionally, make sure you only carry what you need – you don't need to bring everything including the kitchen sink.

15 TRIP PREP

It only takes a few hours of wild weather to make a track impassable, so make sure you take the time to research the area prior to departure. It may have only been a year since you last did the same trip, but a lot can change in a year.

Additionally, knowing the precise location and opening hours of the service stations along your planned route will help to take the guess work out of trip preparation. Most petrol companies provide online services with detailed information on each of their service centres.



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BREATHE EASY

Aside from fuel, there is one other item that every internal combustion engine needs: Air!

WORDS AND PHOTOGRAPHY BY JAMIE BENAUD, AUSTRALIANIMAGES.COM.AU

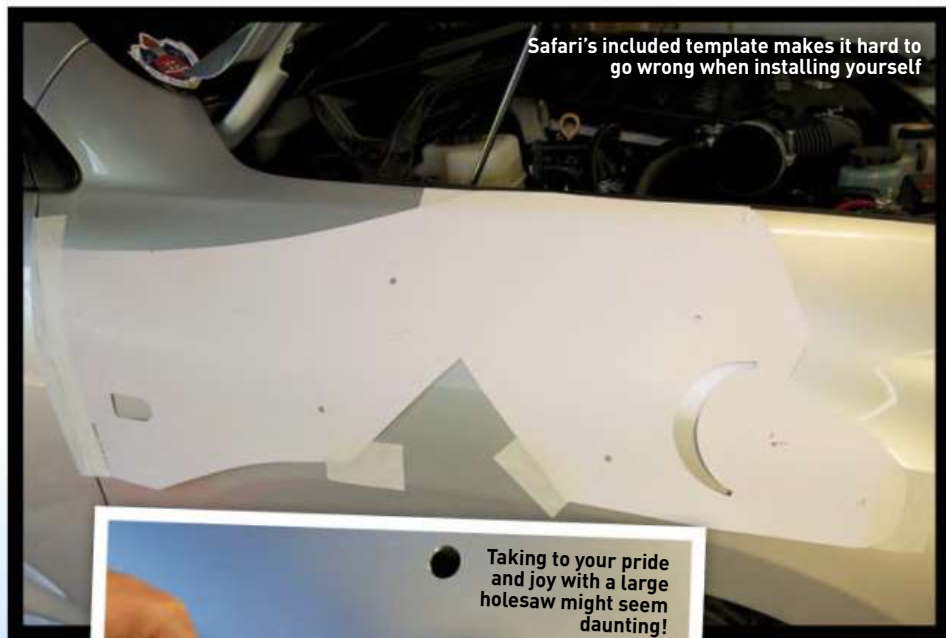
Most vehicles, including the 200-series, draw their engine air from just inside the front guard. This is less than ideal, because not only is it susceptible to water and dust ingestion, but the intake air is warmed slightly by heat coming off the engine.

The solution to all of these issues is to fit a snorkel, raising the air intake to around the top of the windscreen. This will improve the fording capability of your 200, although it's usually wise to avoid deep water in modern vehicles with extensive electronics.

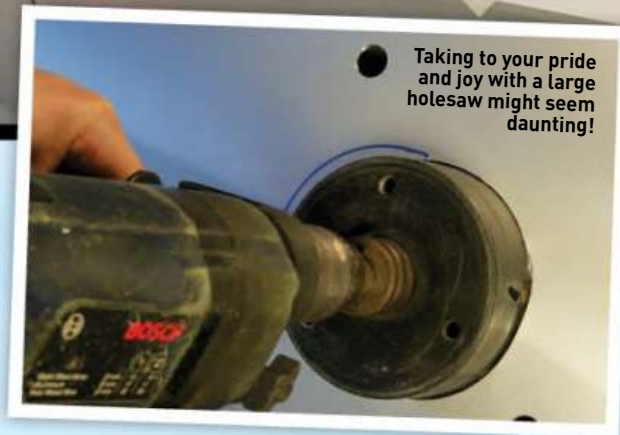
The other big benefit of moving the intake out from the guard is that the dust being thrown up by the front wheel won't enter the primary air filter, reducing maintenance and prolonging engine life (some fine dust always gets past the filter element). For additional protection in very dusty environments, or when travelling in convoy, you can also fit a cyclonic pre-cleaner to the snorkel.

On-road, a snorkel can slightly improve fuel economy both due to the "ram air" effect, and also because the air supplied through the snorkel is generally cooler (denser) than air taken from within the guard or the engine bay.

For these reasons, I've always had snorkels fitted to my vehicles, and it was high on the priority list for the 200. There are a wide selection of snorkels available these days, but purchase with caution. Saving a few hundred dollars on a cheap (and nasty) snorkel could be a very expensive mistake when you consider an engine



Safari's included template makes it hard to go wrong when installing yourself



Taking to your pride and joy with a large holesaw might seem daunting!

The snorkel helps feed your engine with cool, clean air even in dusty conditions. A cyclonic pre-cleaner removes the bulk of dust before it reaches the air filter



replacement in a 200 can be upwards of \$30k. Stick to a quality, well-known brand to ensure it will fit properly, seal against water and dust, and last under the harsh Australian sun.

I've always had my snorkels installed professionally in the past, however in keeping with my objective of DIY installations for Project 200, I decided to do a Safari snorkel fitment myself this time around. It turned out to be a reasonably easy job, once you get over the apprehension of attacking your vehicle with a selection of drills and saws! The supplied template makes it reasonably easy for anyone with moderate mechanical skills to complete the installation. With the template applied to the front guard, it's a simple matter of following the instructions carefully and using the correct size drills at each location. It's important to take your time with the installation, applying touch up paint to all the mounting holes, and ensuring each of the air duct connections are square and well sealed as the snorkel is fitted up to the vehicle.

If you're still apprehensive about fitting yourself, take a look at the step-by-step installation video on the Project 200 website first, and if it still looks a bit daunting, then there's no shortage of quality 4WD accessory shops who will be happy to fit your snorkel for you.



After drilling the main air entry hole, it needs to be extended to an oval shape with a body saw or jigsaw



Painting all the mounting holes will prevent rust in the future



Seal the factory airbox drains with some Sikaflex



The finished product is a neat fit

FIND OUT MORE!

Want to know more about installing a snorkel in your 200? Scan the QR code to visit www.project200.com.au!



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TRIP PLANNING

Proper trip prep is an important ingredient to successful touring

WORDS AND PHOTOGRAPHY BY VIC WIDMAN

Our winter touring season is almost over and you may have just returned from your winter escape to the outback or resolved that next winter you will escape the cold southern states and get up north. Well, start planning now.

To be honest, if you are contemplating a big trip next year your planning should have started back in June. As a minimum you should be looking at the weather conditions being experienced in the areas you will be travelling. Australia is such a big country that in our traditional winter months you can drive from near blizzard conditions to 40 degree plus temperatures in just a few days. For example, during June and July I experienced this first hand with a trip that took me through minus five degrees at Orange in NSW, to freezing cold campsites in outback South Australia around Lake Gairdner. Heading north via the Painted Desert, Ayers Rock, Kings Canyon and Ruby Gap the day time temps slowly increased but the biting wind kept the real effect in the low teens. Nights around Alice Springs, which most people relate to hot desert weather, were definitely beanie wearing material. Finally as I followed the Binns Track north and as general rule for winter months, once we crossed the Tropic of Capricorn, the temperature began to become more pleasant. Within two weeks of off-road travel from ice encrusted swags we were waking up to warm mornings once we got past Tennant Creek.

By the time I reached Katherine it was positively hot with low 30's in the day time and mid-teens in the evening, and it was still early July. The next few weeks up around the Top End and Arnhem Land, well T-shirts and shorts was all that was needed. A great way to spend Winter for sure.

My point of all this is to encourage you to be prepared - imagine how

uncomfortable that first part of the trip would have been if I had not packed appropriate clothing for those two weeks of sub zero overnight temps. It is a mistake that many novices to outback travel make. I know this because as a tour guide I get asked all the time "what will the weather be like on a Simpson trip, hot I imagine as we are going to a desert."

So if you are thinking of heading outback next year, check the local temperatures now to see what it will be like when you get there. Access to this type of info is so easy these days. Most travellers have a smart phone or a laptop with them and if you don't, think about it. Whenever you have phone service you simply check the weather conditions on your phone for the town or location you will be travelling to. Most of these weather apps are free too, so there really is no excuse not to be able to keep abreast of what you will be experiencing.

Back to your trip planning, the other thing you can do now is start collecting information on the areas you will be visiting. Start by searching websites created by local tourist information centres. They will give you a run down on what there is to see and do, and more importantly for outback travel what events might be coming up at the time you will be visiting a particular town. Imagine lobbing into Birdsville on the first weekend in September and not knowing that this was the very weekend that the famous Birdsville races were being held and you

were now going to share the town with 5,000 other people.

Or worse, planning a trip down the Old Ghan Railway line for the long weekend in June only to find it is closed due to the Finke Desert Race using the track as a speedway. By the way, I was out there a few years ago, a week prior to the race, only to find some of the local racers "practicing" on the track - not a good place to be.

So do your research in advance, learn about the places you will be visiting and keep a scrap book on all the things you learn too as this will add enormously to the enjoyment of your trip.

Vic Widman



Vic Widman has been in the business of 4WD driver training and leading 4WD tag-along tours for over 30 years. Vic has trained in excess of 20,000 people in the art of 4WDing and provides corporate 4WD training to many of the country's leading commercial and government organisations.

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THE RIGHT TUNE

Andrew discusses chip stages and which tune is best for your 4WD

WORDS BY ANDREW LEIMROTH, PHOTOS BY OVERLANDER 4WD

Tuning diesels is a simple affair as long as you know what you are doing. There are no spark plugs, points or even a carburettor in diesels.

In fact, whether it is old school or new-school diesel, the simple principle of making a diesel run is still the same: the more fuel, the more power. There are many ways to squeeze this fuel in, so make sure if you are getting it done by a chip that it's doing so safely. Modern EFI-controlled diesels run pretty high turbo boost compared with the old-school diesels, so getting fuel in without smoke is easier than ever.

With all this increased fuel and power comes heat, and this is where consideration needs to be placed on what type of tune you need. While towing would make you think that you need the higher tune for more power, the reality would be that in actual fact it's the time that you need a more conservative power level.

Under towing conditions you will have sustained loaded throttle positions for greater lengths of time, which is a concern if the ambient temperature is high. This all adds up to sustained higher-than-normal running temperatures. If you were just playing



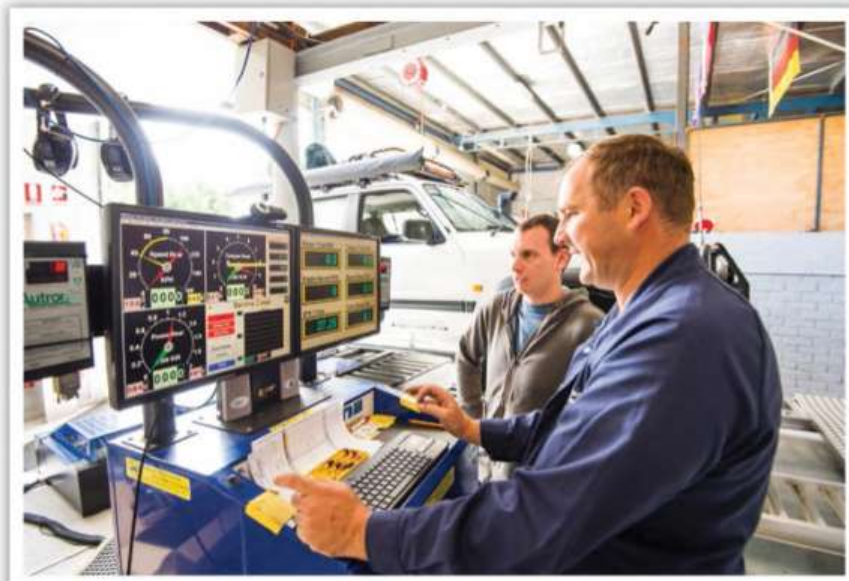
around home commuting, one would think you should have the tune set for economy, but again the opposite could be true. Because you won't be sustaining full-throttle conditions for long, a high tune may in fact be safe.

With high tune levels comes heat and soot levels, and in reality they are less sustainable and generally not good for your engine. Confused now as to which

tune you should take and whether it's a stage one, two or three? My best advice is to stick to something that's proven to work in all conditions so you know it's sustainable. How do you do that?

By making sure you know who is tuning your diesel.

Andrew Leimroth



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SIGNS OF OVER-STRESSED SUSPENSION

Here are the early warning signs that suggests your suspension needs urgent attention

WORDS BY BRAD GREEN, PHOTOGRAPHY BY OVERLANDER 4WD



If you use your 4WD the way it was intended, it mightn't take long for your factory suspension to begin to wear. Considering it's your steering and suspension that determines how your 4WD handles, ensuring they're in top condition could be a matter of life and death. Think about it - what would you do if you lost steering all of a sudden?

Take for instance a wobble through the steering. It's probably one of the most common symptoms we 4WDers face, yet what does it mean? A wobble through the steering wheel typically means something's out of balance or loose in the front end. The tyres might need to be balanced, there could be excessive free-play in the steering components, your wheel bearing could need adjusting or the tyres may be flat-spotted. These are the most common scenarios.

If the steering wheel has a lot of side-to-side play there's a good chance the steering rack, steering box or steering linkages are worn out and need replacing. If you've got larger tyres fitted, the most common area of failure is in the tie-rod ends and ball-joints. 99% of steering vibrations will be solved by

a simple wheel balance and alignment as larger rubber is easily knocked out of sync.

If the problem persists it could be in the hub. To confirm, jack up the vehicle and support it on safety stands. Grab your tyre at 9 o'clock and 3 o'clock, and give it a good wiggle back and forth. Then do the same at 12 o'clock and 6 o'clock. If you feel any knocks or free-play at 9 and 3 it's likely the problem is in the steering. Free-play at 12 and 6 means the wheel bearings or king-pin bearings need attention.

Vibration through the whole vehicle typically means there's an imbalance somewhere other the steering axle. That could be caused by a dodgy driveshaft, uni-joint, rear wheel bearing, a sticking handbrake, or simply an out of balance rear tyre.

If you've done the usual wheel balance and the problem is still present, check the uni-joints by grabbing them and giving them a solid wiggle up-down-side-to-side. Dents or gouges in the driveshaft indicate it's copped a hit from a rock and it could be out of balance. For the handbrake, pull

it apart and check it's not full of mud or over-adjusted. This one might be best left to your mechanic if you're not confident with what you're doing.

Floaty or soft overall handling is usually a sign of worn suspension bushes, shock absorbers, broken swaybar links or a combination of the above. It could also be caused by something as simple as low tyre pressures, so don't forget your basic checks first.

Like anything, though, if you've done everything you can and can't seem to find the problem, it might be best to leave the dirty work to your suspension expert who can help tailor a suspension package to suit your needs. When it comes to suspension, there is rarely ever a one-size-fits all solution.

Brad Green

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TAKING A DIP

Water crossings can cause more damage to a modern 4WD than almost any other terrain. Here's how to tackle them safely

WORDS BY JOHN EGGENHUIZEN, PHOTOS BY OVERLANDER 4WD



We all know how much modern 4WDs rely on electronics, and likewise we all know that water and electricity don't mix. But what about when it comes to modern 4WDs and water crossings? Simply put, education is the key to success.

The biggest rule to tackling river or creek crossings, is to not underestimate them. Whether it's a 100m river crossing, or a 2m wide creek, you need to know what you're getting yourself into before you take the plunge. That's why the first step to any water crossing is to – wherever possible – walk the crossing first.

While you're walking the crossing, have a poke around to look for your entry and exit points, keeping in mind the fact that the best ones might not be immediately apparent. It's all about making it as easy as possible on your vehicle, because the last thing you want is to get stuck trying to exit the river.

If it's running fast, seriously consider whether you need to cross it at all. If it's flowing so hard that you can't walk it, then the general rule is it shouldn't be driven. Water-blinds or tarps help keep water out of the engine bay, so if you've got one, fit it. It's also a good idea to hook the snatch strap up now and have it easily accessible in case things go pear-shaped.

If the river's got a bit of flow to it – and most will – the ideal situation is to start upstream of the exit and then cross the river on a downward angle, using the water to help move you. Trying to do the opposite and drive upstream against the flow is a pointless exercise that increases the likelihood of something going wrong.

Second-low is typically the best bet for gear selection.

Unlike with creek crossings, you want to carry a bit of momentum to create a bow-wave in front of you, which will keep the engine bay as dry as possible. A good way to judge speed is so that the water you're

pushing to the side of the vehicle comes up about to bonnet-height, and no more. Big splashes look spectacular on camera, but they have the potential to drown vehicles by pushing water up into vital electrics.

Once you're through the crossing and up onto the exit bank, stop as soon as you can and let all the water drain back into the river. Keeping the bank as dry as possible prevents erosion from the next vehicle.

As with any off-road driving, I'd strongly recommend that you hit up the experts and get professional driver training. After all, failing on a water crossing can end up costing you a mint!

CONTACT

Got a question you want to ask John? He's always keen to help! Email him at john@getabout.edu.au.

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- Fits in minutes to save you time stripping and soldering wires.
- Each terminal is numbered to make sure you're lining up the correct colour wire.
- The Ezi-Connect also comes with Ark's patented magnets which means you can safely stow your plug on the trailer drawbar when not in use.
- The Nite-Lite incorporates a tiny LED light that helps guide your trailer plugs together.
- No extra wiring is needed to fit the Nite-Lite – it runs on the same circuit as your headlights.

To check out the whole range of trailer plugs and sockets including the Ezi-Connect and Nite-Lite visit www.arkcorporation.com



COLOURFUL COMMS

Colour code your handheld radio with the new colourful UHF range from Uniden

4WDers can stay connected while on the move with the latest range of colourful two-way handheld radios from Uniden. The UH35 series two-way handheld UHF radios combine performance, robust design and ease-of-use for better group communication.



WHAT YOU GET

- Available in triple and quad packs (UH35-3 and UH35-4), the UH35 series offers everyone their own 80 channel personalised handheld radio.
- The ultra-compact, shock resistant and temperature tested radios are perfect for anything you throw at them and anywhere you take them.
- The UH35 series can operate for up to a massive 20 hours and have a range

of three kilometres.

- The communication range can be increased using the Range Extender (Duplex) Capability, depending on terrain.
- Auto Squelch blocks out low level hissing noises for a stronger incoming signal and clearer messages.
- The radios also have an LCD

screen, auto battery save and a battery level indicator.

The Uniden UH35-3 triple pack is available for \$79.95, and the UH35-4 quad pack has an RRP of \$99.95. You can get your hands on a set from leading specialist electrical retailers. For more information check out www.uniden.com.au.

MORE POWER FOR YOUR NAVARA

Upgrade your factory front mount intercooler on your ST-X V6 Navara

High Performance Diesel never stops adding to their already extensive product range. Their latest addition is a bolt-on intercooler upgrade for the Nissan Navara D40 ST-X V6.

WHAT YOU GET

- Fits straight onto the existing factory intercooler mounts.
- Features a massive 600mmx300mmx76mm core.
- Has intercooler Pipework upgrades that grow in size from the HPD Billet Alloy turbo adapter of 57mm right up to 70mm at the inlet manifold.
- Delivering an additional 11 rear wheel kW simply as a bolt on, the kit boasts a massive increase in cooling and airflow.
- Is an excellent starting point for performance upgrades and tuning.

The kit is priced at \$1695.00. To find out more, head over to www.hpdiesel.com.au or call (08) 8299 0320.





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BUYER'S GUIDE

MODEL	CCs	CYL.	TRANS	FUEL TANK	L/100KM	KW/Nm	TOWING	KERB WEIGHT	PAY-LOAD	NEW PRICE
FORD RANGER										
 The new Ranger, with a 2.2L or 3.2L turbo-diesel engine, packs plenty of innovation into a rugged package. The larger engine is the pick, producing 147kW and 470Nm. It has a 3500kg braked towing capacity. The quiet engine and Dynamic Stability Control give the Ranger great on-road manners; and off-road it is excellent. An optional factory rear diff is available on upper-spec models.										
XL 2.2 C/CHAS	2198	DT4	6 M	80	8.1	110/375	750/3500	1762	1436	\$38,390
XL 2.2 CREW C/CHAS	2198	DT4	6 M	80	8.9	110/375	750/3500	1909	1291	\$42,890
XL 2.2 CREW C/CHAS	2198	DT4	6 A	80	9.2	110/375	750/3500	1909	1291	\$44,890
XL 2.2 CREW CAB UTE	2198	DT4	6 M	80	8.1	110/375	750/3500	2034	1166	\$43,890
XL 2.2 CREW CAB UTE	2198	DT4	6 A	80	9.4	110/375	750/3500	2034	1166	\$45,890
XL 3.2 C/CHAS	3198	DT5	6 M	80	8.9	147/470	750/3500	1795	1405	\$40,890
XL 3.2 C/CHAS	3198	DT5	6 A	80	9.2	147/470	750/3500	1795	1405	\$42,890
XL 3.2 SUPER C/CHAS	3198	DT5	6 M	80	8.9	147/470	750/3500	1870	1330	\$43,390
XL 3.2 SUPER CAB UTE	3198	DT5	6 M	80	8.9	147/470	750/3500	2018	1182	\$44,390
XL 3.2 DUAL CAB UTE	3198	DT5	6 M	80	8.9	147/470	750/3500	2068	1132	\$46,390
XL 3.2 DUAL CAB UTE	3198	DT5	6 A	80	9.2	147/470	750/3500	2068	1132	\$48,390
XL 3.2 SUPER CAB UTE	3198	DT5	6 M	80	8.9	147/470	750/3500	2095	1105	\$50,890
XL 3.2 SUPER CAB UTE	3198	DT5	6 A	80	9.2	147/470	750/3500	2095	1105	\$52,890
XL 3.2 DUAL CAB UTE	3198	DT5	6 M	80	9.4	147/470	750/3500	2159	1041	\$53,390
XL 3.2 DUAL CAB UTE	3198	DT5	6 A	80	9.2	147/470	750/3500	2159	1041	\$55,390
WILDTRACK 3.2 DUAL CAB UTE	3198	DT5	6 M	80	9.4	147/470	750/3500	2200	1000	\$57,390
WILDTRACK 3.2 DUAL CAB UTE	3198	DT5	6 A	80	9.6	147/470	750/3500	2200	1000	\$59,390

GREAT WALL V-SERIES

 Great Wall's dual-cab V200 and V240 are available in dual cab or single-cab/chassis configuration. The V200 has the 2.0L turbo-diesel; the V240 has a 2.4L petrol.										
V240 C/CHAS	2378	4	5 M	70	10.7	100/200	750/1900	1507	1320	\$20,990
V240 DUAL CAB UTE	2378	4	5 M	70	10.7	100/200	750/2250	1780	1000	\$25,990
V200 C/CHAS	1996	DT4	6 M	70	8.3	105/310	700/1700	1707	1180	\$22,990
V200 DUAL CAB	1996	DT4	6 M	70	8.3	105/310	750/2000	1835	1000	\$27,990

GREAT WALL X-SERIES

 Based on the V200/V240 platform, the X200 and X240 are the cheapest dual-range-equipped 4WD wagons on the market. The X-Series have the same engines as the V-Series. This is a well-equipped vehicle for the price.										
X240 4D WAGON	2378	4	5 M	-	10.4	100/200	-	1830	475	\$23,990
X200 4D WAGON	1996	DT4	6 M	70	8	105/310	700/1700	1890	660	\$26,990
X200 4D WAGON	1996	DT4	5 A	70	9.2	105/310	700/1700	1890	660	\$28,990

HOLDEN COLORADO

 The 4WD Colorado is available in six variants, all powered by a 3.0L four-cylinder turbo-diesel that's a strong performer and offers a good balance of power/torque and economy. Recent upgrades have lifted towing capacity to 3000kg.										
DX C/CHAS	2776	DT4	5 M	76	8.1	132/440	750/3500	1793	1307	\$34,990
LX C/CHAS	2776	DT4	6 A	76	9.1	132/470	750/3500	1798	1302	\$37,990
LX SPACE C/CHAS	2776	DT4	6 A	76	8.1	132/470	750/3500	1907	1190	\$42,490
LX CREW CAB P/U/P	2776	DT4	5 M	76	7.9	132/440	750/3500	2019	1080	\$44,490
LX CREW C/CHAS	2776	DT4	6 A	76	9.1	132/470	750/3500	1910	1090	\$44,990
LX CREW CAB P/U/P	2776	DT4	6 A	76	9.1	132/470	750/3500	2019	1090	\$46,490
LT CREW CAB P/U/P	2776	DT4	5 M	76	7.9	132/440	750/3500	2007	1090	\$45,490
LT CREW CAB P/U/P	2776	DT4	6 A	76	9.1	132/470	750/3500	2007	1090	\$47,490
LTZ SPACE CAB P/U/P	2776	DT4	6 A	76	9.1	132/470	750/3500	2034	1066	\$49,490
LTZ CREW CAB P/U/P	2776	DT4	5 M	76	7.9	132/440	750/3500	2056	1040	\$49,990
LTZ CREW CAB P/U/P	2776	DT4	6 A	76	9.1	132/470	750/3500	2056	1040	\$51,990

ISUZU D-MAX

 The new Isuzu D-MAX has a powerful and fuel-efficient 3.0-litre turbo-diesel and has more safety features as standard - including dual front, side and curtain airbags, Anti-lock Brake System and Electronic Brakeforce Distribution - than ever before. There's also Electronic Stability Control and Traction Control systems, plus Brake Assist. This is a great all-round package.										
EX C/CHAS	2999	DT4	5 M	76	8.3	130/380	750/3500	-	-	\$33,400
LS-M HI-RIDE CREW CAB	2999	DT4	5 M	76	8.3	130/380	750/3500	-	-	\$44,000
LS-M HI-RIDE CREW CAB	2999	DT4	5 A	76	8.1	130/380	750/3500	-	-	\$46,200
SX HI-RIDE CREW CAB	2999	DT4	5 M	76	8.3	130/380	750/3500	-	-	\$42,000
SX HI-RIDE CREW CAB	2999	DT4	5 A	76	8.1	130/380	750/3500	-	-	\$44,200
LS-TERRAIN HI-RIDE CREW	2999	DT4	5 M	76	8.3	130/380	750/3500	-	-	\$49,500
LS-TERRAIN HI-RIDE CREW	2999	DT4	4 A	76	8.1	130/380	750/3500	-	-	\$51,700
LS-U HI-RIDE SPACE CAB	2999	DT4	5 M	76	8.3	130/380	750/3500	-	-	\$43,700
LS-U HI-RIDE SPACE CAB	2999	DT4	5 A	76	8.1	130/380	750/3500	-	-	\$45,900
LS-U HI-RIDE CREW CAB	2999	DT4	5 M	76	8.3	130/380	750/3500	-	-	\$45,500
LS-U HI-RIDE CREW CAB	2999	DT4	5 A	76	8.1	130/380	750/3500	-	-	\$47,700
SX C/CHAS	2999	DT4	5 M	76	8.3	130/380	750/3500	-	-	\$36,490
SX C/CHAS	2999	DT4	5 A	76	8.1	130/380	750/3500	-	-	\$38,600
SX SPACE C/CHAS	2999	DT4	5 M	76	8.3	130/380	750/3500	-	-	\$39,100
SX SPACE C/CHAS	2999	DT4	5 A	76	8.1	130/380	750/3500	-	-	\$41,300
SX CREW C/CHAS	2999	DT4	5 M	76	8.3	130/380	750/3500	-	-	\$43,100
SX CREW C/CHAS	2999	DT4	5 A	76	8.1	130/380	750/3500	-	-	\$45,500

MODEL	CCs	CYL.	TRANS	FUEL TANK	L/100KM	KW/Nm	TOWING	KERB WEIGHT	PAY-LOAD	NEW PRICE
ISUZU MU-X										
 The MU-X is Isuzu's first offer in the 4WD wagon market and follows on from the success of the D-MAX. With three models and two transmissions and a 3.0L turbo-diesel engine on offer, the MU-X is a surprisingly off-road capable, but family-friendly touring option.										
LS-M	2999	DT4	5 A	65	8.4	130/380	750/3000	2000	750	\$47,800
LS-M	2999	DT4	5 M	65	8.4	130/380	750/3000	2000	750	\$45,600
LS-T	2999	DT4	5 A	65	8.4	130/380	750/3000	2060	690	\$53,500
LS-U	2999	DT4	5 A	65	8.4	130/380	750/3000	2040	710	\$49,300
LS-U	2999	DT4	5 M	65	8.4	130/380	750/3000	2040	710	\$47,100

JEEP CHEROKEE

 Four variants, three off-road systems and two engines mean there's a Cherokee for every purpose - even some pretty serious off-roading. The Jeep Cherokee has raised the bar when it comes to transmissions by equipping the entire model range with a first-in-segment nine-speed automatic as standard.										
LONGITUDE	3239	V6	9 A	60	10.0	200/316	470/2200	1795	-	\$39,000
LIMITED	3239	V6	9 A	60	10.0	200/316	450/2200	1806	-	\$44,000
TRAILHAWK	3239	V6	9 A	60	10.0	200/316	2450/2200	1936	-	\$47,500

JEEP GRAND CHEROKEE

 New Grand Cherokee is a significant departure from previous models as it has a fully independent suspension system. Available with a 3.0L turbo-diesel V6, 3.6L petrol V6 and 5.7L petrol V8. The SRT 8 has a monster 6.4L petrol V8 with a price tag to match.										
JET	3604	V6	5 A	93.5	11	210/347	750/2268	2191	760	\$46,500
LAREDO	2987	DTV6	5 A	93.5	8.3	177/550	750/2268	2191	760	\$50,000
LAREDO	3604	V6	5 A	93.5	11	210/347	750/2268	2191	760	\$45,000
LIMITED	2987	DTV6	5 A	93.5	8.3	177/550	750/2268	2191	760	\$60,000
LIMITED	3604	V6	5 A	93.5	11	210/347	750/2268	2191	760	\$55,000
LIMITED	5654	V8	5 A	93.5	14.1	259/520	750/3500	2191	760	\$60,000
OVERLAND	2987	DTV6	5 A	93.5	8.3	177/550	750/3500	2307	660	\$69,500
OVERLAND	3604	V6	5 A	93.5	11	210/347	750/2250	2280	660	\$65,000
OVERLAND	5654	V8	5 A	93.5	14.1	259/520	750/3500	2307	660	\$69,500
SRT 8	6424	V8	5 A	91	14.1	344/624	750/2268	2336	612	\$76,000
SRT 8 ALPINE	6424	V8	5 A	91	14.1	344/624	750/2268	2336	612	\$81,900
SRT 8 VAPOUR	6424	V8	5 A	91	14.1	344/624	750/2268	2336	612	\$81,900

JEEP WRANGLER 2 DOOR

 The Wrangler was updated with the addition of a 3.6L V6 petrol producing 209kW. This is matched to a 6-speed manual or 5-speed auto. The 2.8L turbo-diesel is still available, with torque boosted to 460Nm. An off-road pack is available on petrol and diesel Sport models.										
SPORT S/TOPI	3604	V6	6 M	70	11.4	209/347	750/1600	1855	365	\$32,500
SPORT S/TOPI	3604	V6	5 A	70	11.6	209/347	750/1600	1855	365	\$34,500
SPORT S/TOPI	2776	DT4	5 A	66	8.6	147/460	750/1600	1975	-	\$39,500
SPORT S/TOPI	2776	DT4	6 M	66	8	147/460	750/1600	1975	-	\$38,500
RENEGADE SPORT H/TOP	3778	V6	6 M	70	10.4	146/315	750/1600	1855	-	\$35,000
RENEGADE SPORT H/TOP	3778	V6	5 A	70	11.6	146/315	750/1600	1855	-	\$37,000
RENEGADE SPORT H/TOP	2776	DT4	5 A	66	8.1	147/460	750/1600	1975	-	\$42,000
RENEGADE SPORT H/TOP	2776	DT4	6 M	66	8	147/460	750/1600	1975	-	\$41,000
RUBICON S/TOPI	3604	V6	6 M	70	11.4	209/347	750/1600	1885	365	\$43,000
RUBICON S/TOPI	3604	V6	5 A	70	11.6	209/347	750/1600	1885	365	\$45,000

JEEP WRANGLER UNLIMITED 4 DOOR



With plenty of internal cabin space thanks to its longer wheelbase, the Jeep Wrangler Unlimited is the most affordable solid-axle 4-door 4WD wagon on the market. It is now available with the newer, more powerful 3.6L V6 in Sport and Rubicon, alongside the older 3.8L V6 in Renegade.

SPORT S/TOPI	3604	V6	6 M	85	11.4	209/347	750/2300	2050	-	\$36,500
SPORT S/TOPI	3604	V6	5 A	85	11.7	209/347	750/2300	2050	-	\$38,500
SPORT S/TOPI	2776	DT4	6 M	85	8.3	147/410	750/2300	2105	-	\$42,500
SPORT S/TOPI	2776	DT4	5 A	85	8.8	147/460	750/2300	2105	-	\$43,500
RENEGADE H/TOP	3778	V6	6 M	85	11.4	209/347	750/2300	2050	-	\$39,500
RENEGADE H/TOP	3778	V6	5 A	85	11.7	209/347	750/2300	2050	-	\$41,500
RENEGADE H/TOP	2776	DT4	6 M	85	8.3	147/410	750/2300	2105	-	\$45,500
RENEGADE H/TOP	2776	DT4	5 A	85	8.8	147/460	750/2300	2105	-	\$46,500
RUBICON S/TOPI	3604	V6	6 M	85	11.8	209/347	750/2300	2080	-	\$47,000
RUBICON S/TOPI	3604	V6	5 A	85	11.9	209/347	750/2300	2080	-	\$49,000

MODEL	CCs	CYL	TRANS	FUEL TANK	L/100KM	Kw/Nm	TOWING	KERB WEIGHT	PAY-LOAD	NEW PRICE
LAND ROVER DEFENDER										
	The Defender is very capable off-road, and surprisingly good on-road thanks to its frugal and adequately powerful turbo-diesel engine but it still feels and drives like a truck. Recently expanded range offers nine models on three different wheelbases. A 2.2L turbo-diesel joined the 2.4L in 2012.									
90	2179	DT4	6M	60	10	90/360	750/3500	1815	935	\$44,990
110 2D HARDTOP	2179	DT4	6M	75	11	90/360	750/3500	2014	1010	\$46,690
110 CREW CAB P/UP	2179	DT4	6M	75	11	90/360	750/3000	1940	1110	\$49,690
110 HCPU P/UP	2179	DT4	6M	75	11.1	90/360	750/3000	1660	1410	\$48,190
110 4D WAGON	2179	DT4	6M	75	11	90/360	750/3500	2014	1010	\$49,690
130 C/CHAS	2179	DT4	6M	75	11	90/360	750/3500	2120	1380	\$48,690
130 CREW C/CHAS	2179	DT4	6M	75	11	90/360	750/3500	2120	1380	\$52,690
130 HCPU CREW CAB P/UP	2179	DT4	6M	75	11	90/360	750/3500	2120	1380	\$54,190

MAHINDRA PIK-UP

	The Pik-Up is a relatively modern design that performs well and appears to be well built. The four-model Pik-Up range (ute or cab-chassis with single or double cabs) all have turbo-diesel power and part-time, dual-range 4WD. Lots of metal for your money. *Prices are drive-away.									
C/CHAS	2179	DT4	5M	80	9.1	85/270	750/2500	2090	1060	\$26,499
2D UTE	2179	DT4	5M	80	9.1	85/270	750/2500	2090	1060	\$27,499
DOUBLE C/CHAS	2179	DT4	5M	80	9.1	85/270	750/2500	2150	1000	\$29,999
DUAL CAB UTE	2179	DT4	5M	80	9.1	85/270	750/2500	2150	1000	\$30,499

MAZDA BT50

	The new BT-50 rattled the dual-cab cage with a powerful 3.2L turbo-diesel engine and car-like refinement. The exterior styling has divided the 4WD community but this Mazda's rugged off-road ability, 3.35 tonne towing capacity, and 8.9L/100km fuel consumption make it a worthy candidate for a great work and play ute. Styling aside, it's almost identical to the Ranger, only more affordable.									
XT C/CHAS	3196	DT5	6M	80	8.9	147/470	750/3500	1789	1411	\$36,810
XT FREESTYLE C/CHAS	3196	DT5	6M	80	8.9	147/470	750/3500	1857	1343	\$40,740
XT DUAL C/CHAS	3196	DT5	6M	80	8.9	147/470	750/3500	1929	1271	\$42,740
XT DUAL CAB UTE	3196	DT5	6M	80	8.9	147/470	750/3500	2044	1156	\$44,240
XT DUAL CAB UTE	3196	DT5	6A	80	9.2	147/470	750/3500	2044	1156	\$46,240
XTR FREESTYLE UTE	3196	DT5	6M	80	8.9	147/470	750/3500	2037	1163	\$46,890
XTR DUAL CAB UTE	3196	DT5	6M	80	8.9	147/470	750/3500	2086	1114	\$48,890
XTR DUAL CAB UTE	3196	DT5	6A	80	9.2	147/470	750/3500	2086	1114	\$50,890
GT DUAL CAB UTE	3196	DT5	6M	80	8.9	147/470	750/3500	2095	1105	\$51,140
GT DUAL CAB UTE	3196	DT5	6A	80	9.2	147/470	750/3500	2095	1105	\$53,140

MERCEDES-BENZ G

	The Mercedes Benz G-Class or G-Wagen remains stylistically similar to versions that rolled off the production line in 1979. Current-spec G-Wagen is available to Australians, with a 3.0-litre turbo-diesel V6 and a supercharged 5.4 litre petrol V8.									
350	2987	DTV6	7A	96	11.2	155/540	-	2458	700	\$161,180
55 AMG	5439	SV8	5A	96	15.9	373/700	-	2471	620	\$216,730

MITSUBISHI CHALLENGER

	New-gen Challenger is based on the MN model Triton but has a coil-sprung rear live-axle instead of a leaf-sprung rear axle. All models have the same 2.5L four-cylinder turbo-diesel but only the base model has a five-speed manual. Other models have the five-speed auto as offered in top-spec Triton. All models get Mitsubishi's Super Select 4WD system and electronic traction and stability control. A seven-seat option is available for the base LS. Towing capacity is 3000kg.									
CHALLENGER 30th ANNIV.	2477	DT4	5M	70	8.3	131/400	750/2500	2051	640	\$41,490
CHALLENGER 30th ANNIV.	2477	DT4	5A	70	9.8	131/350	750/2500	2051	640	\$43,990
CHALLENGER	2477	DT4	5M	70	8.3	131/400	750/2500	2019	691	\$41,490
CHALLENGER	2477	DT4	5A	70	9.8	131/400	750/2500	2029	681	\$43,990
LS (5 SEAT)	2477	DT4	5M	70	8.3	131/400	750/3000	2041	669	\$45,490
LS (5 SEAT)	2477	DT4	5A	70	9.8	131/350	750/3000	2051	659	\$47,990
LS (7 SEAT)	2477	DT4	5A	70	9.8	131/350	750/3000	2106	609	\$49,890
XLS (5 SEAT)	2477	DT4	5A	70	9.8	131/350	750/3000	2059	651	\$55,290
XLS (7 SEAT)	2477	DT4	5A	70	9.8	131/350	750/3000	2110	606	\$57,190

MODEL	CCs	CYL	TRANS	FUEL TANK	L/100KM	Kw/Nm	TOWING	KERB WEIGHT	PAY-LOAD	NEW PRICE
MITSUBISHI PAJERO										
	The NW Pajero is still the only serious Japanese 4WD to use fully independent suspension and monocoque construction. It has class-leading on-road dynamics and excels in the bush. Excluding the Exceed 3.8L V6, petrol engines have been dropped from the range in favour of the updated 3.2L turbo-diesel: 147kW and 441Nm. A minor facelift and improved safety features are the only other main features of the new NW.									
EXCEED LWB	3200	DT4	5A	88	9	147/441	750/3000	2347	683	\$73,990
EXCEED LWB	3828	V6	5A	88	13.5	184/329	750/3000	2250	670	\$71,490
GLX-R LWB	3200	DT4	5A	88	9	147/441	750/3000	2314	716	\$58,990
GLX-R LWB	3200	DT4	5M	88	8.4	147/441	750/3000	2324	706	\$55,990
VR-X LWB	3200	DT4	5A	88	9	147/441	750/3000	2325	706	\$63,990
VR-X LWB	3200	DT4	5M	88	9	147/441	750/3000	2325	706	\$60,990
GLX LWB	3200	DT4	5A	88	9	147/441	750/3000	2273	750	\$53,990
GKX LWB	3200	DT4	5M	88	8.4	147/441	750/3000	2283	740	\$50,990

MITSUBISHI TRITON

	The Triton has a 2.5L turbo-diesel with more power and torque than the outgoing 3.2L diesel. While a five-speed manual is standard, a four-speed auto (+\$2000) is optional on GLX and GL-R double cabs; the GLX-R gets an optional (+\$3000) five-speed auto. The GLX-R also gets Super-Select 4WD; other models have part-time 4WD. Side airbags, and electronic traction and stability control are available.									
GLX C/CHAS	2477	DT4	5M	75	9.1	131/400	750/3000	1810	1120	\$33,990
GLX CLUB CAB UTE	2477	DT4	5M	75	8.1	131/400	750/2700	1873	1057	\$38,240
GLX DOUBLE CAB UTE	2477	DT4	5M	75	9.1	131/400	750/3000	1905	1025	\$40,990
GLX DOUBLE CAB UTE	2477	DT4	4A	75	9.9	131/350	750/3000	1905	1025	\$42,990
GL-R DOUBLE CAB UTE	2477	DT4	5M	75	9.1	131/400	750/3000	1920	1010	\$43,990
GL-R DOUBLE CAB UTE	2477	DT4	4A	75	9.9	131/350	750/3000	1920	1010	\$45,990
GLX-R DOUBLE CAB UTE	2477	DT4	5M	75	9.1	131/400	750/3000	1920	1010	\$45,740
GLX-R DOUBLE CAB UTE	2477	DT4	5A	75	9.9	131/350	750/3000	1920	1010	\$48,240

NISSAN PATHFINDER

	The R52 Pathfinder moves even further away from a genuinely capable 4WD than it's fully independent predecessor did. It's a clear step towards modernity in design, and offers a more car-like performance and amenity.									
ST (4x4)	3498	V6	CVT	73	10.2	190/325	750/2700	1985	730	\$44,490
ST-L (4x4)	3498	V6	CVT	73	9.9	190/325	750/2700	2025	690	\$54,490
Ti (4x4)	3498	V6	CVT	73	9.9	190/325	750/2700	2065	650	\$65,090

NISSAN PATROL Y61

	Despite facelifts and dropping all engines bar the 3.0L common-rail turbo-diesel the Nissan Patrol GU remains largely the same vehicle since 1997. The Patrol's chassis is as tough and durable as they come and formidable off road but the engine is not state of the art.									
ST COIL C/CHAS	2953	DT4	5M	175	12.5	118/380	750/3200	2009	1140	\$55,050
ST 4DR WAGON	2953	DT4	5M	125	10.9	118/380	750/3200	2450	580	\$57,390
ST 4DR WAGON	2953	DT4	4A	125	11.8	118/354	750/2500	2450	580	\$60,390
DX 4DR WAGON	2953	DT4	5M	125	10.9	118/380	750/3200	2360	670	\$53,890
DX 4DR WAGON	2953	DT4	4A	125	11.8	118/354	750/3200	2360	650	\$56,890

NISSAN PATROL Y62

	Launched in late 2012 the Y62 Patrol is the Nissan's latest generation 4WD. With independent suspension and a plethora of high-tech driving aids it performs well. However, the decision to only launch a petrol engine in Australia has hurt long-term sales. Fans eagerly await a hinted-at diesel variant.									
Ti 4DR WAGON	5552	V8	7A	140	14.5	298/560	750/3500	2800	700	\$92,850
Ti-L 4DR WAGON	5552	V8	7A	140	14.5	298/560	750/3500	2829	670	\$113,900
ST 4DR WAGON	5552	V8	7A	140	14.5	298/560	750/3500	2739	760	\$82,200



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BUYER'S GUIDE

NISSAN NAVARA



Two generations of the Navara sell side-by-side. There's the D40 (at left) and the older D22 which was reintroduced in 2008. The D22 comes standard with a 2.5L turbo-diesel, while the D40 range receives an uprated 2.5L turbo-diesel, producing more power than the D22's. Even more impressive though is the 3.0L turbo-diesel V6: 170kW and a whopping 550Nm. All ST-X dual cabs have side and curtain airbags, as well as electronic traction and stability control.

ST 25TH AN. D/CAB P/U/P	2488	DT4	5A	80	10.5	140/450	750/3000	1985	-	\$44,138
ST 25TH AN. D/CAB P/U/P	2488	DT4	6M	80	9.8	140/450	750/3000	1985	-	\$41,888
DX C/CHAS	2488	DT4	5M	75	9.1	98/304	750/2800	1723	-	\$32,835
RX DUAL CAB P/U/P	2488	DT4	5A	80	10.5	128/403	750/3000	1930	-	\$43,850
RX DUAL CAB P/U/P	2488	DT4	6M	80	9.8	128/403	750/3000	1930	-	\$41,600
RX KING C/CHAS	2488	DT4	5A	80	10.5	126/406	750/3000	1751	1110	\$42,450
RX KING C/CHAS	2488	DT4	6M	80	9.8	126/403	750/3000	1751	1110	\$40,200
RX C/CHAS	2488	DT4	6M	80	9.3	106/356	750/3000	1630	1230	\$35,060
RX DUAL C/CHAS	2488	DT4	5A	80	10.5	128/403	750/3000	1930	-	\$42,150
RX DUAL C/CHAS	2488	DT4	6M	80	9.8	128/403	750/3000	1930	-	\$39,900
ST DUAL CAB P/U/P	2488	DT4	5A	80	10.5	140/450	750/3000	1985	-	\$49,550
ST DUAL CAB P/U/P	2488	DT4	6M	80	9.8	140/450	750/3000	1985	-	\$47,300
ST-X 550 DUAL CAB	2991	DTV6	7A	80	9.5	170/550	750/3000	1920	910	\$63,390
ST-R SPECIAL ED.D/CAB	2488	DT4	5M	75	9.2	98/304	750/2800	1823	-	\$33,990
ST-X KING C/CHAS	2488	DT4	5A	80	10.5	126/403	750/3000	1769	1090	\$45,460
ST-X KING C/CHAS	2488	DT4	6M	80	9.8	126/403	750/3000	1769	1090	\$43,210
ST-X KING CAB P/U/P	2488	DT4	5A	80	10.5	126/403	750/3000	1921	940	\$47,160
ST-X KING CAB P/U/P	2488	DT4	6M	80	9.8	126/403	750/3000	1921	940	\$44,910
ST-X DUAL CAB P/U/P	2991	DTV6	7A	80	9.5	170/550	750/3000	1985	820	\$57,290

RANGE ROVER SPORT



Based on the Discovery 4, the Range Rover Sport is available with several engine options including the 3.0L turbo-diesel V6, as well as a 5.0L petrol V8, with a supercharged variant. Offering unparalleled road handling, as well as being very capable off-road thanks to Land Rover's Terrain Response System, the Sport offers the best of both worlds in one package.

3.0 SDV6	2993	DTV6	6A	90	9.2	180/600	750/3500	2535	640	\$100,900
3.0 SDV6 LUXURY	2993	DTV6	6A	90	11.1	180/600	750/3500	2656	519	\$113,900
3.0 SDV6 AUTOBIOGRAPHY	2993	DTV6	6A	90	11.1	180/600	750/3500	2656	519	\$128,900
5.0 V8 LUXURY	5000	V8	6A	90	13.9	276/510	750/3500	2489	581	\$139,900
5.0 V8 SUPERCHARGED	5000	SV8	6A	90	14.9	375/625	750/3500	2590	535	\$161,400
5.0 V8 SC AUTOBIOGRAPHY	5000	SV8	6A	90	14.9	375/625	750/3500	2590	535	\$175,900

RANGE ROVER VOGUE



The Range Rover Vogue has the new 4.4-litre twin-turbo V8 diesel that claims 230kW but, more impressively, a massive 700Nm on tap from as low as 1500rpm and doesn't abate until 3000rpm. This new engine is mated to the same eight-speed ZF gearbox as in the 2010 update of the BMW X5. The two petrol V8s, one with a supercharger, are carried over unchanged and are still mated to the 6-speed ZF box.

5.0 V8	5000	V8	6A	105	14	276/510	750/3500	2615	490	\$158,100
TdV8	4367	DTV8	8A	105	9.4	230/700	750/3500	2710	490	\$160,500
5.0 V8 SILVER	5000	V8	6A	105	14	276/510	750/3500	2615	490	\$161,400
5.0 V8 BLACK	5000	V8	6A	105	14	276/510	750/3500	2615	490	\$163,300
TdV8 SILVER	4367	DTV8	8A	105	9.4	230/700	750/3500	2710	490	\$163,800
TdV8 BLACK	4367	DTV8	8A	105	9.4	230/700	750/3500	2710	490	\$165,700
LUXURY TDV8	4367	DTV8	8A	105	9.4	230/700	750/3500	2710	490	\$184,200
LUXURY V8 SC	5000	SV8	6A	105	14.9	375/625	750/3500	2710	490	\$202,100
AUTOBIOGRAPHY TDV8	4367	DTV8	8A	105	9.4	230/700	750/3500	2710	490	\$214,300
AUTOBIOGRAPHY SC 5.0 V8	5000	SV8	6A	105	14.9	375/625	750/3500	2710	433	\$231,800
ULTIMATE SC 5.0	5000	SV8	6A	105	14.9	375/625	750/3500	2710	433	\$318,000
ULTIMATE TDV8	4367	DTV8	8A	105	9.4	230/700	750/3500	2710	490	\$300,000

SSANGYONG ACTYON



Actyon comes as a five-door SUV and a dual-cab ute. Both are built on a separate chassis and feature dual-range gearing, all of which sets the Actyon apart from the crowd. There are also 2WD versions of the ute in Tradie and Sports spec. Base-spec Tradie ute is a cost-effective alternative to mainstream Japanese utes. Optional auto (six-speed on ute, four-speed on SUV) adds \$3000.

A200 XDI	1998	DT4	5M	75	7.8	104/310	750/2300	1903	620	\$26,990
A200 XDI	1998	DT4	4A	75	8.5	104/310	750/2300	1903	620	\$29,990
A200 SPR XDI	1998	DT4	4A	75	8.5	104/310	750/2300	1903	620	\$34,990
SPORTS TRADIE DOUBLE CAB UTE	1998	DT4	M	75	7.4	104/310	750/2300	1912	830	\$28,282
SPORTS TRADIE DOUBLE CAB UTE	1998	DT4	6A	75	7.9	104/310	750/2300	1912	830	\$30,782
SPORTS DOUBLE CAB UTE	1998	DT4	6M	75	7.4	104/310	750/2300	1912	830	\$32,282
SPORTS DOUBLE CAB UTE	1998	DT4	6A	75	7.9	104/310	750/2300	1912	830	\$34,872
SPORTS SPR DOUBLE CAB UTE	1998	DT4	6A	75	7.9	104/310	750/2300	1963	830	\$37,742

SUZUKI JIMNY



The Jimny is the latest in the long line of Suzuki's Tonka-tough midgets and combines live-axle coil-spring suspension, separate chassis and dual-range gearing to offer solid off-road ability. Small size and tiny turning circle make it great in town, but a harsh ride, small 1.3L engine and low gearing make highway work tiresome. But it's very handy off road and a great first off-roader.

SIERRA 2D	1328	4	5M	60	7.3	60/110	350/1300	1045	375	\$20,490
SIERRA 2D	1328	4	4A	60	7.8	60/110	350/1300	1050	370	\$22,490

SUZUKI GRAND VITARA



The Grand Vitara is available in three- and five-door variants with three different engines, new four and six-cylinder petrols and a four-cylinder turbo-diesel. The new petrols are a welcome addition as the original ones were sub-standard. The five-door model comes with the choice of all three engines; the manual-only diesel is the pick of the bunch. All Grand Vitara models have traction and stability control as standard. This is the class standard-setter.

2D	2393	4	5M	55	8.8	122/225	550/1600	1459	410	\$24,990
2D	2393	4	4A	55	9.6	122/225	550/1600	1459	410	\$26,990
4D	2393	4	5M	66	8.9	122/225	750/1850	1567	530	\$28,990
4D	2393	4	4A	66	9.9	122/225	750/1850	1567	530	\$30,990
4D	1870	DT4	5M	66	6.8	95/300	750/2000	1630	540	\$35,990
SPORTS 4D	2393	4	5M	66	8.9	122/225	750/1850	1567	530	\$31,490
SPORTS 4D	2393	4	4A	66	9.9	122/225	750/1850	1567	530	\$33,490
PRESTIGE 4D	2393	4	4A	66	9.9	122/225	750/1850	1567	530	\$38,990

TOYOTA FJ CRUISER



Australia received the FJ Cruiser five years later than the US, but since its launch it has proved a brilliant performer off-road. The 200kW 4.0L petrol V6 and low kerb-weight (2000kg) gives it a great power-to-weight ratio, while the factory rear diff-lock and driver aids help maintain progress in the rough. The lack of a diesel variant or manual box will disappoint some, and the retro styling has polarised 4WDers.

FJ CRUISER	3956	V6	5A	159	11.4	200/380	750/2250	1955	555	\$46,490
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TOYOTA LANDCRUISER PRADO



The new Prado 150 Series is slightly bigger, heavier and more aerodynamic than the 120 Series but carries over the D-4D diesel engine and five-speed auto and six-speed manual gearboxes, largely unchanged. The petrol V6 does get a power boost over the 120 thanks to variable timing on the inlet and exhaust cams. All five-door models now seat seven. Two three-door models (auto diesel only) offer a 3000kg tow rating as against the five-doors' 2500kg rating. Auto gearbox on lower-spec models adds \$2500.

SX 2D WAGON	2982	DT4	5A SEQ	87	8.3	127/410	750/3000	2095	505	\$56,090
ZR 2D WAGON	2982	DT4	5A SEQ	87	8.3	127/410	750/3000	2145	455	\$67,490
ALTITUDE	3956	V6	5A SEQ	150	11.5	202/381	750/2500	2250	650	\$68,490
ALTITUDE	2982	DT4	5A SEQ	150	8.5	127/410	750/2500	2330	660	\$69,490
GXL	3956	V6	6M	150	13	202/381	750/2500	2250	650	\$60,490
GXL	3956	V6	5A SEQ	150	11.5	202/381	750/2500	2250	650	\$62,990
GXL	2982	FT4	6M	150	8.8	127/410	750/2500	2330	660	\$61,490
GXL	2982	DT4	5A SEQ	150	8.5	127/410	750/2500	2330	660	\$63,990
KAKADU	3956	V6	5A SEQ	150	11.5	202/381	750/2500	2355	545	\$90,490
KAKADU	2982	DT4	5A SEQ	150	8.5	127/410	750/2500	2435	555	\$91,490
VX	3956	V6	5A SEQ	150	11.5	202/381	750/2500	2345	555	\$76,990
VX	2982	DT4	5A SEQ	150	8.5	127/410	750/2500	2425	565	\$77,990
GX	2982	DTE	6M	150	8.8	127/410	750/2500	2210	780	\$55,990
GX	2982	DT4	5A SEQ	150	8.5	127/410	750/2500	2210	780	\$58,254

TOYOTA LANDCRUISER 200 SERIES



The 200 Series arrived late in 2007 with an updated 4.7L petrol V8 and an all-new twin-turbo diesel V8, in three spec levels but only as an auto. The D-4D V8 is a great engine but attracts a \$10K premium over the petrol. All models are better equipped than 100 Series with KDSS suspension standard on all but D-4D GXL. The 200 is bigger than the 100 and accommodates up to eight in comfort. The 200 is also safer with up to 10 airbags depending on spec. Being safer, more powerful and better equipped than its predecessors, the 200 is also more costly. More affordable GX standard spec has vinyl floors, barn doors and a factory snorkel. The GXL Altitude was our 2011 4WD Of The Year winner.

GX	4461	DTV8	6A	138	10.3	195/650	750/3500	2635	715	\$77,490
GXL	4608	V8	6A	138	13.6	228/439	750/3500	2635	665	\$83,490
GXL	4461	DTV8	6A	138	10.3	195/650	750/3500	2700	600	\$88,490
ALTITUDE	4664	V8	5A	138	14.5	202/410	750/3500	2635	665	\$90,490
VX	4608	V8	6A	138	13.6	228/439	750/3500	2665	645	\$84,490
VX	4461	DTV8	6A	93	10.3	195/650	750/3500	2720	580	\$99,490
SAHARA	4608	V8	6A	138	13.6	228/439	750/3500	2665	645	\$113,490
SAHARA	4461	DTV8	6A	93	10.3	195/650	750/3500	2720	580	\$118,490

TOYOTA LANDCRUISER 76 SERIES



Some people call it a four-door Troopie, but Toyota's 76 Series wagon uses the body of what was essentially the original 1985 Prado that was never imported into Australia. Powered by Toyota's new gen (at the time) V8 turbo-diesel, the 76 originally filled a gap in Toyota's model range left by the lack of a Standard model 200 Series. Although aimed at the commercial market, the 76 is a great enthusiast's vehicle. The recent upgrade to driver and passenger airbags is a welcome move.

WORKMATE 4D WAGON	4461	DTV8	5M	130	11.9	151/430	750/3500	2220	780	\$59,990
GXL 4DR WAGON	4461	DTV8	5M	130	11.9	151/430	750/3500	2230	770	\$64,290



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MODEL	CCs	CYL	TRANS	FUEL TANK	L/100KM	Kw/Nm	TOWING	KERB WEIGHT	PAY-LOAD	NEW PRICE
TOYOTA LANDCRUISER 78 SERIES										
	Like the 79 Series cab-chassis models and the updated 76 Series wagon, the 78 Series Troop Carrier is powered by Toyota's 4.5L V8 turbo-diesel. With 430Nm available from just 1200rpm it makes the gearbox almost redundant. Basic Workmate model comes with three or 11 seats, while GXL has five seats. Factory diff locks make the 78 virtually unstoppable. A great bush tourer, now even better with driver and passenger airbags.									
WORKMATE 3 SEAT TROOPCARRIER	4461	DTV8	5 M	180	11.9	151/430	750/3500	2320	980	\$65,790
WORKMATE 11 SEAT TROOPCARRIER	4461	DTV8	5 M	180	11.9	151/430	750/3500	2320	980	\$66,890
GXL TROOPCARRIER	4461	DTV8	5 M	180	11.9	151/430	750/3500	2335	965	\$67,990

TOYOTA LANDCRUISER 79 SERIES										
	The 'working' LandCruiser has new-gen V8 turbo-diesel power, which will cop service in many Toyotas for years to come; the state of tune will vary within the model range. Recent upgrade has brought a new dashboard with driver and passenger airbags, as well as reach- and height-adjustment on the steering wheel. Optional front and rear diff locks are a great bonus off road.									
WORKMATE C/CHAS	4461	DTV8	5 M	180	11.5	151/430	750/3500	2045	1250	\$58,790
GX C/CHAS	4461	DTV8	5 M	180	11.5	151/430	750/3500	2050	1250	\$60,790
GXL C/CHAS	4461	DTV8	5 M	180	11.5	151/430	750/3500	2065	1235	\$62,790

TOYOTA LANDCRUISER DOUBLE CAB										
	The LC70 Double Cab has the same 4.5L V8 turbo-diesel as in the entire 70 series line-up. With an updated interior, ABS, dual front SRS airbags and 4 wheel discs brakes, in GXL guise it has been a hit in the mining community plus with many off-road enthusiasts. With optional front and rear diff locks, it is a solid performer in the bush, however, air-con is still only an option.									
WORKMATE DOUBLE C/CHAS	4461	DTV8	5 M	130	11.9	151/430	750/3500	2205	1100	\$63,990
GXL DOUBLE C/CHAS	4461	DTV8	5 M	130	11.9	151/430	750/3500	2205	1100	\$67,990

MODEL	CCs	CYL	TRANS	FUEL TANK	L/100KM	Kw/Nm	TOWING	KERB WEIGHT	PAY-LOAD	NEW PRICE
TOYOTA HILUX										
	With so many 4WD variants on offer it's no wonder that the Hilux is its segment leader and Australia's best-selling 4WD. There are two engines, a 4.0-litre petrol and a 3.0-litre turbo-diesel, three body styles, single cab, extra cab and double cab, two spec levels, and manual and auto gearboxes. The recent update has given the Hilux a redesigned front, improved audio systems and an increased 2.5 tonne towing capacity.									
WORKMATE C/CHAS	2982	DT4	5M	75	8.2	126/343	750/2250	1675	1160	\$31,990
WORKMATE C/CHAS	2982	DT4	4A	75	9.3	126/343	750/2250	1675	1160	\$33,990
WORKMATE DUAL CAB P/UP	2982	DT4	5M	75	8.3	126/343	750/2500	1845	935	\$38,990
WORKMATE DUAL CAB P/UP	2982	DT4	4A	75	9.3	126/343	750/2500	1845	935	\$40,990
SR C/CHAS	2982	DT4	5M	76	8.2	126/343	750/2500	1620	1215	\$34,990
SR C/CHAS	2982	DT4	4A	76	9.3	126/343	750/2500	1620	1215	\$37,490
SR X CAB C/CHAS	2982	DT4	5M	76	8.2	126/343	750/2500	1770	940	\$38,490
SR X CAB P/UP	2982	DT4	5M	75	8.3	126/343	750/2500	1810	900	\$39,990
SR DUAL C/CHAS	2982	DT4	5M	76	8.3	126/343	750/2500	1825	955	\$40,490
SR DUAL CAB P/UP	3956	V6	5M	76	13.1	175/376	750/2500	1765	1045	\$41,990
SR DUAL CAB P/UP	3956	V6	5A	76	13	175/376	750/2500	1765	1045	\$44,490
SR DUAL CAB P/UP	2982	DT4	5M	76	8.3	126/343	750/2500	1815	965	\$41,990
SR DUAL CAB P/UP	2982	DT4	4A	76	9.3	126/343	750/2500	1815	965	\$44,490
SR5 X CAB P/UP	2982	DT4	5M	76	8.3	126/343	750/2500	1830	980	\$46,990
SR5 DUAL CAB P/UP	3956	V6	5M	76	13.1	175/376	750/2500	1770	1040	\$50,990
SR5 DUAL CAB P/UP	3956	V6	5A	76	13	175/376	750/2500	1770	1040	\$53,490
SR5 DUAL CAB P/UP	2982	DT4	5M	76	8.3	126/343	750/2500	1865	915	\$50,990
SR5 DUAL CAB P/UP	2982	DT4	4A	76	9.3	126/343	750/2500	1865	915	\$53,490

VOLKSWAGEN AMAROK										
	European style and build quality from the Volkswagen Amarok brings a refreshing change to the Australian dual-cab market. The 2.0L turbo-diesel produces 120kW and 400Nm, incredible for an engine of its size. The Amarok proved its off-road ability as a main support vehicle in the 2010 Dakar Rally, and with a competitive pricepoint, you'll struggle to find a dual cab that offers such good value.									
TDI400 C/CHAS	1968	DT4	6 M	80	7.8	120/400	750/3000	1865	1175	\$35,490
TDI400 UTILITY	1968	DT4	6 M	80	7.8	120/400	750/3000	1865	1175	\$36,990
TDI400 DUAL CAB	1968	DT4	6 M	80	7.9	120/400	750/3000	1978	1062	\$42,990
TDI400 DUAL C/CHAS	1968	DT4	6 M	80	7.9	120/400	750/3000	1978	1062	\$41,490
TDI420 HIGHLINE D/CAB	1968	DT4	8 A	80	8.3	132/420	750/3000	2080	960	\$53,990
TDI400 HIGHLINE D/CAB	1968	DT4	6 M	80	7.9	120/400	750/3000	2073	960	\$50,990
TDI420 DUAL CAB	1968	DT4	8 A	80	8.3	132/420	750/3000	1985	1055	\$45,990
TDI420 DUAL C/CHAS	1968	DT4	8 A	80	8.3	132/420	750/3000	1985	1055	\$44,490
TDI400 TRENDLINE D/CAB	1968	DT4	6 M	80	7.9	120/400	750/3000	2018	1022	\$45,990
TDI400 TRENDLINE DUAL C/CHAS	1968	DT4	6 M	80	7.9	120/400	750/3000	2018	1022	\$44,490
TDI420 TRENDLINE D/CAB	1968	DT4	8 A	80	8.3	132/420	750/3000	2026	1014	\$48,990
TDI420 TRENDLINE DUAL C/CHAS	1968	DT4	8 A	80	8.3	132/420	750/3000	2026	1014	\$47,490
TDI420 ULTIMATE D/CAB	1968	DT4	8 A	80	8.3	132/420	750/3000	2094	946	\$61,490
TDI400 ULTIMATE D/CAB	1968	DT4	6 M	80	7.9	120/400	750/3000	2087	953	\$58,490
TDI400 ULTIMATE (PERM) D/CAB	1968	DT4	6 M	80	7.9	120/400	750/3000	2087	953	\$58,490

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